CHAPTER 2
ALTERNATIVES CONSIDERED

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CHAPTER 2
ALTERNATIVES CONSIDERED

2.0 INTRODUCTION

This chapter presents and describes the alternatives considered for meeting the need and purpose for the Trinity Parkway, including those eliminated from further analysis. In accordance with guidelines provided in FHWA's Technical Advisory T 6640.8A (1987), all reasonable alternatives have been evaluated. Because the alternatives were evaluated in a series of documents, this chapter summarizes the alternatives development process through the MTIS, DEIS, SDEIS, and LSS (see **FEIS Section 1.6.2** for discussion relating to these documents). Five Alternatives are discussed in this chapter: the No-Build Alternative (see **FEIS Section 2.2**) and four Build Alternatives (see **FEIS Section 2.3.2**). These are identified as Alternative 1, which is the No-Build Alternative, Build Alternatives 2A and 2B along Irving/Riverfront Boulevard, and Build Alternatives 3C and 4B within the Dallas Floodway. Information about the engineering and access considerations used in evaluating the four Build Alternatives is included in **FEIS Sections 2.4** and **2.5**, respectively. In addition, other considerations that influenced the evaluation of the Build Alternatives for the Trinity Parkway are context-specific issues related to cost and financing that apply to the construction and operation of a toll road facility that would not apply to a non-tolled roadway (**FEIS Section 2.6**). Similarly, considerations that are unique to Build Alternatives proposed for construction largely within the Dallas Floodway are discussed in **FEIS Section 2.7**.

Much of this chapter (**FEIS Section 2.8**) describes the process leading up to the FHWA's decision to recommend Build Alternative 3C for further design refinement and updated impacts analysis. That is, subsequent to the development of design and impacts information in the SDEIS, as supplemented or updated for some topics in the LSS, the FHWA then sought agency and public comments on the SDEIS and LSS in public hearings held in 2009 and 2012, respectively. The collective information contained in these two NEPA documents, combined with input from agencies and the public, was used to facilitate a comparative evaluation of all four of the Build Alternatives under consideration. This evaluation of alternatives considered the aspects discussed in **FEIS Sections 2.4** through **2.7**, as well as other relevant considerations previously discussed in the SDEIS and LSS, to weigh the bank of information developed to that point in time (i.e., 2012). This weighing of information was conducted jointly with the consideration of myriad factors required to evaluate the practicability of alternatives pursuant to federal regulations implementing Executive policy on floodplains and wetlands. This section provides the rationale

for recommending Alternative 3C for further development to a higher level of detail in this FEIS. However, after completing the environmental review of the FEIS and the consideration of comments from all sources, the FHWA will select one of the five alternatives in the anticipated ROD. The final section of this chapter (**FEIS Section 2.9**) discusses design refinements for FHWA-recommended Alternative 3C resulting from changed conditions affecting planned transportation projects to the north and south of the Trinity Parkway. This section also discusses whether such design refinements would affect the engineering or access considerations relating to the earlier design of Alternative 3C covered in **FEIS Sections 2.4** and **2.5**.

2.1 TRINITY PARKWAY CORRIDOR MTIS

This section provides an overview of the federal MIS process and includes a summary of the published *Trinity Parkway Corridor* MTIS (TxDOT, 1998a).

2.1.1 Overview of the Federal MIS Process

MISs were called for in the ISTEA of 1991, and MIS requirements were initially implemented by joint FHWA/FTA planning regulations issued in 1993 (23 CFR Section 450.318). A 'major metropolitan transportation investment' is officially described as a "highway or transit improvement of substantial cost that is expected to have a significant effect on capacity, traffic flow, level of service, or mode share at the transportation corridor or subarea scale" (23 CFR Section 450.104). The ISTEA and the 1993 implementing regulations required the USDOT to consider a broad range of evaluation criteria during the preparation of "corridor" or "subarea" studies. In 1998, a provision of TEA-21 (Section 1308) instructed the USDOT to discontinue the earlier requirement for preparing "stand-alone" MIS documents. The TEA-21 law also instructed the USDOT to promulgate regulations requiring the integration of analyses under the planning provisions of TEA-21 and NEPA for federally-funded highway and transit projects. Joint FHWA/FTA regulations implementing the joint NEPA and transportation planning requirements of TEA-21 were promulgated in 2007 (72 *Federal Register* 7261, February 14, 2007; 23 CFR Parts 450 and 500, and 49 CFR Part 613).

The corridor or subarea planning approach provides broader involvement of the local community in developing the design concept and scope of proposed major transportation investments. The planning and decision making process is coordinated with the MPO and other affected agencies, such as the state departments of transportation. In addition, integrated environmental analysis must be conducted, as well as modal trade-off analyses. Effective collaboration with diverse

interest groups is extremely important during evaluation of alternatives and development of a consensus plan.

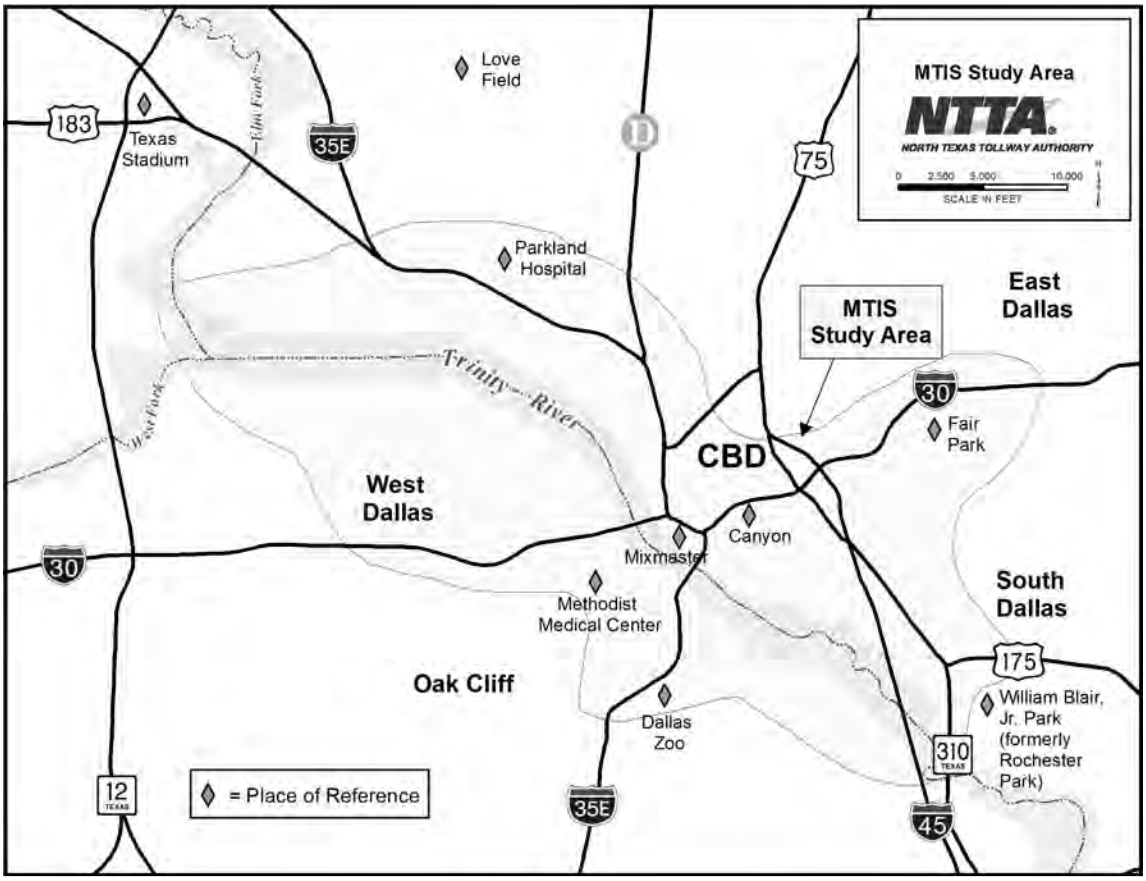
MIS procedures stress the integration of social, economic, and environmental considerations early in planning analyses and transportation decision making. For instance, the MIS must include provisions for achieving compliance with clean air goals by conforming to the SIP. In addition, the principles and specific requirements of the NEPA philosophy and policy mandates are stressed throughout the planning regulation. The MIS is not a separate requirement, but a more targeted sub-element of the planning process that draws on the general integration of planning within the broader NEPA principles.

2.1.2 Summary of the Trinity Parkway Corridor MTIS

TxDOT conducted the *Trinity Parkway Corridor MTIS* in 1996 and 1997, and the findings of the study were published in *Study Report, Trinity Parkway Corridor* in March 1998 (TxDOT, 1998b) (TxDOT Dallas District, CSJ Numbers 0918-45-121 and -122).

The MTIS was completed in order to develop a LPP to address transportation problems within the Trinity Parkway Corridor, and to integrate with community plans and goals for the Dallas Floodway. The MTIS focused on transportation needs in the area of the Dallas CBD. The MTIS study area, shown in **Figure 2-1**, extended beyond the downtown area to cover a reasonable area of influence of the Canyon, Mixmaster, and Lower Stemmons segments on area transportation facilities.

FIGURE 2-1. TRINITY PARKWAY CORRIDOR MTIS STUDY AREA



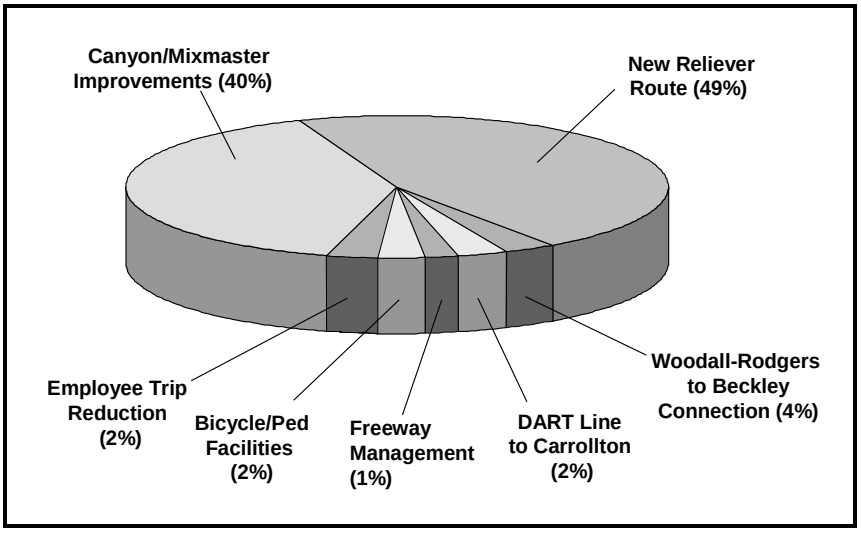
The MTIS involved extensive public input, technical study and evaluation, and used a three-stage process to develop a recommended plan of action. The first stage identified the transportation demand on the roadway and rail transit system within the study area and analyzed conceptual improvements that might serve this demand. The second stage developed preliminary alignments of alternatives identified for further study from the first-stage process. The third stage developed layouts of alternatives identified for further study from the second stage. Third stage alternatives were screened and combined to form a recommended plan of action. The criteria for screening alternatives included engineering constraints, ability to meet the project need, safety and operations, cost, stakeholder goals, impacts to natural resources, and social constraints.

The MTIS recommended plan of action was composed of seven elements, which included improvements to existing facilities, promoting alternative transportation modes, and new facility construction, as identified below:

1. Enhanced work trip reduction measures;
2. Bicycle and pedestrian facilities;
3. Enhanced transportation facility management;
4. Improvements to the Canyon, Mixmaster, and Lower Stemmons Freeway Corridors;
5. Extension of Woodall Rodgers Freeway westward across the Dallas Floodway to connect to Singleton Boulevard and Beckley Avenue;
6. A continuous HOV system through the Canyon, Mixmaster, and Lower Stemmons Corridors; and
7. A Trinity Parkway reliever route (proposed action).

Figure 2-2, obtained from the MTIS report, shows the plan of action represented as a pie chart, with sizes of individual slices shown in proportion to the approximate amount of transportation improvement provided. The chart is based on an overall goal from the MTIS of providing an additional 250,000 daily person trips of capacity added or demand reduced in the Canyon, Mixmaster, and Lower Stemmons Corridors. The pie chart is somewhat simplified because the various action items have slightly different proportionate shares in different segments of the corridor. The chart emphasizes the importance of Items 4 (Canyon/Mixmaster/Lower Stemmons) and 7 (proposed action) to the overall transportation solution.

FIGURE 2-2. TRINITY PARKWAY CORRIDOR MTIS PLAN OF ACTION



The MTIS concluded that all seven components of the recommended plan were needed and that no single measure, or combination of less than all seven measures, would meet the transportation demand and address the transportation problems. Various agencies, including the NTTA, TxDOT, DART, and the City of Dallas, have taken responsibility for implementation of portions of the plan. For instance, Item 5 was advanced by TxDOT and the City of Dallas as the Margaret Hunt Hill (Signature) Bridge over the Trinity River, which opened on March 29, 2012. Additionally, part of Item 4 is being advanced by TxDOT as the Dallas Horseshoe Project to improve the Mixmaster and replace the IH-30 and IH-35E Bridges over the Dallas Floodway. The Dallas Horseshoe Project is a break-out project that was originally part of Project Pegasus, which included improvements to sections of the depressed portion of IH-30 known as the Canyon and the portion of IH-35E from the Mixmaster to SH-183 known as Lower Stemmons. Project Pegasus remains part of the regional transportation plans, but has been deferred in *Mobility 2035 – 2013 Update* awaiting funding (see **FEIS Section 2.9.1.1** for additional discussion on Project Pegasus). In addition, the DART Orange Line has been expanded to Belt Line Road, which opened on December 3, 2012, and the last segment to DFW Airport Terminal A is scheduled to be completed in late 2014. Item 7 from the plan, the proposed Trinity Parkway reliever route, is the subject of this FEIS.

The MTIS developed specific roadway alternatives on corridors under consideration throughout the Trinity Parkway EIS process. The roadway proposals were developed with varied operational assumptions such as freeway, parkway, tollway, reversible lanes, and HOV/High-Occupancy Toll (HOT) lanes (note that “High Occupancy Toll” lanes, also referred to as “Managed” lanes, refer to various operational and design strategies that increase roadway efficiency to better match regional goals. Single Occupant Vehicle (SOV) users are charged the full toll rate and HOV users are charged the full rate or a reduced rate). The four corridors considered in the MTIS were:

1. IH-35E;
2. Irving/Industrial (subsequently renamed Riverfront) Boulevard;
3. The east Trinity River levee; and
4. The west Trinity River levee.

All of the corridors were considered between identical termini locations (IH-35E/SH-183 and US-175/SH-310). Several alternative cross sections and operational scenarios were developed for each of these four corridors. Alignments for the alternative cross sections and corridor components were selected based on three different, general strategies for providing needed capacity improvements:

1. Providing all HOV/HOT and general-use lane reliever capacity;
2. Providing only HOV/HOT capacity; and
3. Providing only general-use lane reliever capacity.

Tables 2-1 through **2-4** provide an abbreviated record of the range of alternatives considered. Additional information regarding these alternatives can be obtained from the MTIS published report (TxDOT, 1998a).

TABLE 2-1. IH-35E (STEMMONS FREEWAY) CORRIDOR ALIGNMENTS

Alignment	Description
I35-1a	Four-lane elevated freeway with two at-grade HOV/HOT lanes and two additional general-purpose lanes (eight additional lanes total) with compensatory widening [55 feet on each side]. Requires rebuilding IH-35E within project limits.
I35-1b	Eight-lane elevated freeway with two at-grade HOV/HOT lanes (10 additional lanes total) with minimal compensatory widening [12 feet on each side]. Requires rebuilding IH-35E within project limits.
I35-2a	Two-lane elevated HOV/HOT lanes with two at-grade HOV/HOT lanes on IH-35E (four additional lanes total) with minimal compensatory widening [12 feet on each side]. This alignment requires totally rebuilding existing IH-35E within the project limits.
I35-2b	Two-lane elevated HOV/HOT lanes with two at-grade HOV/HOT lanes (two additional lanes total). Takes two existing general-purpose lanes from IH-35E with no compensatory widening. Requires rebuilding existing IH-35E within project limits.
I35-3	Four-lane at-grade HOV/HOT lanes (four additional lanes total) with compensatory widening [36 feet on each side]. This alignment requires totally rebuilding existing IH-35E within the project limits.
I35-4	Four-lane at-grade HOV/HOT lanes. Requires four existing general-purpose lanes from IH-35E with no compensatory widening.
I35-5a	Two-lane HOV/HOT lanes on elevated structure (two additional lanes total) with no widening required. Provides HOV/HOT capacity without taking or rebuilding any existing general-purpose lanes on IH-35E.
I35-5b	Two-lane at-grade HOV/HOT lanes on IH-35E. Takes two existing general-purpose lanes from IH-35E with no compensatory widening.
I35-5c	Two-lane at-grade HOV/HOT lanes on IH-35E (two additional lanes total) with compensatory widening. Requires rebuilding IH-35E within project limits.
Abbreviations used in Table: HOV/HOT = High-Occupancy Vehicle/High-Occupancy Toll.	

TABLE 2-2. IRVING/INDUSTRIAL BOULEVARD CORRIDOR ALIGNMENTS

Alignment	Description
IND-1	Eight-lane elevated freeway with two elevated HOV/HOT lanes (10 additional lanes total) with compensatory widening [47 feet on each side]. Existing Irving/Industrial Boulevard remains in place. Requires reconstruction or double decking of lanes to connect back to the Mixmaster area.
IND-2	Four-lane at-grade freeway with four-lane at-grade HOV/HOT lanes and access roads (eight additional lanes total) with ROW widening [247 feet on one side]. Existing Irving/Industrial Boulevard replaced with access roads. Requires reconstruction or double decking of lanes at Mixmaster area.
IND-3	Eight-lane at-grade "super" thoroughfare with grade separation at major intersections (eight lanes replaced existing six lanes). Requires ROW widening of 20 feet on each side. Requires rebuilding existing Irving/Industrial Boulevard within project limits.
IND-4	Four-lane elevated HOV/HOT lanes (four additional lanes total). Requires ROW widening of 12.5 feet on each side of the existing roadways. Existing Irving/Industrial Boulevard remains in place.
IND-5	Two-lane elevated HOV/HOT lanes (two additional lanes total) on a "T" bridge within the existing median of Irving/Industrial Boulevard. Requires no additional ROW. Existing Irving/Industrial Boulevard remains in place.
Abbreviations used in Table: HOV/HOT = High-Occupancy Vehicle/High-Occupancy Toll; ROW = right-of-way.	

TABLE 2-3. TRINITY PARKWAY CORRIDOR ALIGNMENTS

Alignments	Description
TL-1a, TL-1b, TL-1c	Directional parkway along both levees (five lanes on each side with three reversible lanes). Requires reconstruction of 12 and 16 cross- street bridges, respectively.
TL-2a, TL-2b, TL-2c	Conventional thoroughfare along the east or west levee (six lanes with median).
TL-3a, TL-3b, TL-3c	Asymmetrical thoroughfare along both levees (six lanes on each side - four lanes in one direction and two in the opposite direction). Requires reconstruction of eight and 16 cross-street bridges respectively.
TL-4a, TL-4b, TL-4c	Split freeway along both levees with southbound lanes on the west levee and northbound lanes on the east levee (four lanes on each side). Requires reconstruction of eight and 16 cross-street bridges, respectively.
TL-5a, TL-5b, TL-5c	Full freeway section along the east levee (eight lanes). Requires reconstruction of six and eight cross-street bridges, respectively.
TL-7a, TL-7b, TL-7c	Divided parkway along both levees (four lanes on each side). Requires reconstruction of eight and 16 cross-street bridges, respectively.
TL-6a, TL-6b, TL-6c	HOV/HOT lanes along the east levee (two lanes). Requires reconstruction of six cross-street bridges each.
TL-8a, TL-8b, TL-8c	Full freeway section along the east or west levee with two-lane HOV/HOT lanes (eight lanes total). Requires reconstruction of six and eight cross-street bridges, respectively.
Abbreviations used in Table: HOV/HOT = High-Occupancy Vehicle/High-Occupancy Toll.	

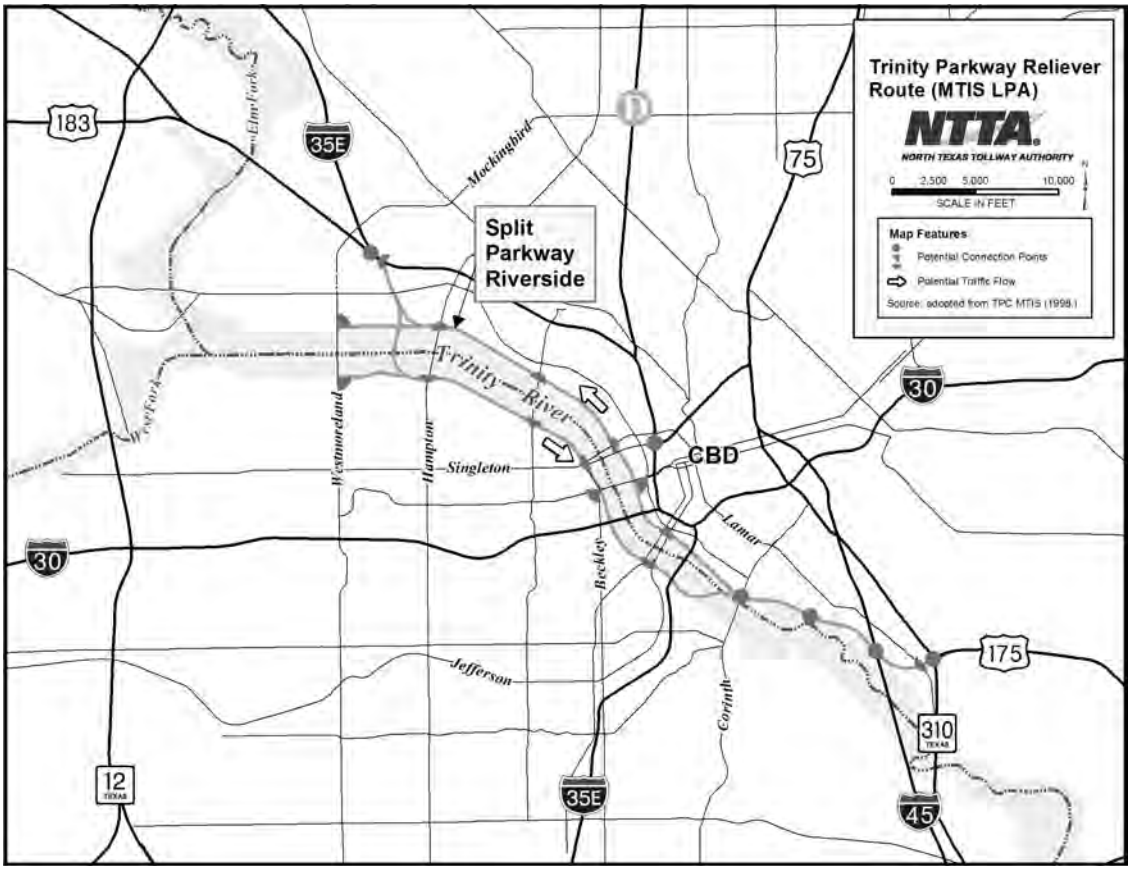
TABLE 2-4. TRINITY PARKWAY CORRIDOR - SOUTHERN TERMINUS

Alignment	Description
1 - Lamar Street	Full eight-lane parkway following the alignment of Lamar Street, with access roads replacing Lamar Street.
2 - Railroad	Full eight-lane parkway generally following the east side of the UP Railroad.
3 - East Levee	Full eight-lane parkway generally following the proposed east Lamar Levee extension.
4- Split West-East Levee	Split eight-lane parkway generally following the proposed Dallas Floodway levee extensions.
5 - Combined East Levee/Railroad	Full eight-lane parkway following the proposed east Lamar Levee extension down to MLK, Jr. Boulevard, then following the east side of the UP Railroad.

The MTIS roadway analysis concluded that an expansion of capacity on IH-35E to meet the reliever route's full travel demand was not practical, primarily due to excessive cost, extreme difficulties in carrying additional lanes through the Mixmaster, and adverse impacts on adjacent properties. The preferred approach was to place HOV/HOT lanes along IH-35E, to expand and improve the Canyon and Mixmaster to the extent practical due to physical constraints, and to seek additional capacity through a reliever along another route. The MTIS included developmental work on route alternatives along the Trinity River Corridor, specifically TL-5a (a combined parkway with eight general-purpose lanes along the riverside of the east levee), TL-7a (a split parkway with four general-purpose lanes along the riverside of both levees), and TL-7c (a split parkway with four general-purpose lanes along the landside of both levees).

A reliever route alternative located primarily within the Dallas Floodway was identified as the locally-preferred alternative (LPA) based on the MTIS evaluation that included the following considerations: social, economic, and environmental effects; construction and ROW costs; engineering considerations; and extensive agency/public involvement. The concept adopted for this alternative was an eight-lane split parkway (reducing to six lanes in the southern segment) with controlled access and a design speed of 50 mph with a posted speed limit of 45 mph. The general location of the LPA reliever route is shown on **Figure 2-3**.

FIGURE 2-3. TRINITY PARKWAY RELIEVER ROUTE (MTIS LPA)



The MTIS recognized, however, that the selection of a reliever route would require subsequent studies. As anticipated, additional route alternatives along Irving/Riverfront Boulevard were included in the DEIS, SDEIS, and LSS, and are carried forward in this FEIS.

The possibility of implementing the Trinity Parkway reliever route as a toll facility was outlined in the MTIS. However, as noted in **FEIS Section 1.1.2**, the agreements to pursue the toll facility implementation did not occur until after completion of the original study. The toll proposal is being pursued due to regional transportation funding shortfalls; the expectation that substantial delays in implementation of the roadway would occur if non-toll funding is used; and the obligation that toll facilities be pursued according to the RTC's policy of evaluating toll feasibility on all new freeway facilities in new ROW. As a result, NTTA has been designated to take the lead on Trinity Parkway as it is being pursued as a toll facility. NTTA is the Regional Tollway Authority, organized under Chapter 366 of the Texas Transportation Code, for the area of Collin, Dallas, Denton, and Tarrant counties in north central Texas. Toll facility implementation would involve jointly developing and financing the Trinity Parkway with a combination of tollway revenue bonds, city bonds, and federal and/or state transportation funds.

The decision to toll the facility has caused some modifications to the original MTIS reliever road concept. Aside from the obvious changes (i.e., toll gantries) needed for the operation of a toll facility, the operating speed of the facility has been increased from 45 mph to 55 mph. The speed increase is required to allow a more attractive travel time advantage on the toll road compared to other available toll-free (tax supported) roads. The increase in speed has affected the control of access on the roadway, preventing previously proposed left side exits from the roadway mainlanes to the adjacent park areas. This issue is further discussed in **Section 2.7.3** of this FEIS. Additionally, during the development of the DEIS, the proposed Trinity Parkway was reduced to six mainlanes based on refined traffic volume projections and associated traffic capacity LOS analyses, public input, concerns regarding environmental impacts and costs due to the scale of an eight-lane facility (as presented in the MTIS), and also for compatibility with local plans.

2.2 NO-BUILD ALTERNATIVE

The No-Build Alternative (Alternative 1) represents the case in which the Trinity Parkway is not constructed. The No-Build Alternative has the advantage of avoiding any adverse impacts associated with new construction, such as relocation, land use changes, and environmental disruption. The No-Build Alternative would allow construction funds to be allocated to other projects.

The MTP, however, includes a Trinity Parkway reliever route, which is a key element to the functioning of the plan. Other transportation improvements identified in the MTP, including planned roadway and transit system improvements, bicycle/pedestrian facilities, ITS technology, and Transportation System Management (TSM)/Travel Demand Management (TDM) measures, may or may not be constructed depending on project development and funding availability issues. Implementation of the No-Build Alternative would jeopardize the balance and efficiency of the entire transportation system by not addressing any of the stated project needs.

Although the No-Build Alternative avoids construction impacts, the problems associated with the lack of a northwest-southeast reliever route around downtown Dallas would remain. As previously discussed in **FEIS Section 2.1.2**, the MTIS concluded that without the construction of a reliever route, local transportation needs could not be met. This conclusion is also supported by the DEIS, SDEIS, and LSS documents. The costs associated with the No-Build Alternative, along with the adverse impacts related to traffic congestion such as air pollution, noise, and decreased pedestrian and vehicular safety, could create an undesirable urban environment that

would have more long-term adverse impacts than the short-term construction impacts. The costs of the No-Build Alternative include the following:

- Maintenance of the existing system - the longer improvements and/or reconstruction are postponed, the higher this figure becomes;
- Increased vehicle operating costs on under-designed, inadequate facilities;
- Increased tangible and intangible costs due to higher rates of accidents and incidents on existing facilities;
- The monetary value of time lost by motorists due to lower operating speeds, congested roadway conditions, and restricted maneuverability on area roadways;
- The intangible costs associated with the inconvenience for emergency services and annoyance for average motorists caused by the above deficiencies; and
- Increased costs of other planned improvements to the Canyon/Mixmaster/Lower Stemmons Corridors due to lack of the proposed action (Trinity Parkway) which could otherwise provide a detour route during construction.

The No-Build Alternative is expected to result in travelers experiencing worsened traffic congestion in the future. Growth in employment and population would be expected to increase daily travel volumes within the Dallas CBD to the point that transportation improvements similar to the Trinity Parkway or otherwise would be implemented. That delay in implementation may reasonably be expected to result in higher construction costs and greater disruption to the community, due in part from ROW acquisition in newly-developed or redeveloped areas of the corridor

2.3 BUILD ALTERNATIVES

2.3.1 Summary of DEIS/SDEIS Alternatives Not Advanced

Building on the MTIS and the NEPA scoping process, the DEIS used the same corridors as the MTIS. Throughout the NEPA planning process, project sponsors have endeavored to identify and evaluate a reasonable number of representative alternatives, as required by the long-standing NEPA guidance in FHWA's Technical Advisory T6640.8A (FHWA, 1987). The DEIS analyzed six Build Alternatives (Alternatives 2A, 2B, 3A, 3B, 4A, and 5) as well as the No-Build Alternative. The SDEIS republished the DEIS along with evaluating two additional Build Alternatives (Alternatives 3C and 4B) based on agency consultation after the February 2005 publication of the DEIS. A total of eight Build Alternatives and the No-Build Alternative were evaluated as part of the SDEIS. However, based on correspondence with the USACE and further

evaluation following the release of the SDEIS and subsequent public hearing, the alternatives described below were considered unworkable due to concerns relating to the potential of each alternative to interrupt flood control operations and adversely impact the existing or planned expansion of the floodway levees.

2.3.1.1 Alternative 3A (Combined Parkway – Original)

The original Combined Parkway (Alternative 3A) was presented in concept in the July 1999 scoping meeting for the Trinity Parkway DEIS and was developed during the early stages of preparation of the DEIS. Alternative 3A was formed by combining the MTIS preliminary alignments TL-5a (north segment) and 5 (south segment) (see **Tables 2-3** and **2-4**), except that the mainlanes were modified to six lanes throughout. The alternative is called "original" to differentiate it from the "modified" versions of the Combined Parkway (Alternatives 3B and 3C) which were generated in 2003 and 2007, respectively. As originally proposed, Alternative 3A was approximately 8.67 miles in length and would have required approximately 371 acres of ROW.

Alternative 3A was proposed to travel south from the IH-35E/SH-183 interchange, passing over Commonwealth Drive and Irving Boulevard, and reaching the Dallas Floodway in the area west of Hampton/Inwood Road. The alignment then turned southeast along the riverside of the Dallas Floodway east levee, following the riverside edge of the levee southeast to the DART Bridge. The alignment then crossed the levee and followed the landside of the future USACE DFE east levee extension (Lamar Levee) to IH-45. The route then turned east to the US-175/SH-310 interchange.

In the Dallas Floodway segment, the proposal for Alternative 3A was to place the tollway on an earthen embankment, typically set above the 100-year flood level. However, at existing bridge crossings of the floodway, the tollway profile was depressed to pass under the existing structures. At these locations, a flood separation wall was proposed to prevent inundation during a 100-year flood event. Alternative 3A would have required retaining walls to be placed on the levee-side of the tollway at depressed locations to accommodate a levee raise under consideration by the City of Dallas and USACE.

2.3.1.2 Alternative 3B (Combined Parkway – Modified)

Alternative 3B was added in the Trinity Parkway DEIS at the request of the City of Dallas in 2003. The alternative was developed as part of a planning study of the Trinity River Corridor initiated by the city in 2002. The study was published in the BVP report. Alternative 3B was a variant of the

original Combined Parkway (Alternative 3A) described above, distinguished by geometric changes that primarily consisted of deletion and modification of ramps in the general area of downtown Dallas and proposed City of Dallas floodway lakes. The City of Dallas requested that Alternative 3B be included due to its reduced ramp intrusion in the Dallas Floodway area compared to Alternative 3A, and its revision of the tolling plan to exclude any mainlane toll gantries from the Dallas Floodway. As originally proposed, Alternative 3B was approximately 8.67 miles in length and would have required approximately 372 acres of ROW.

2.3.1.3 Alternative 4A (Split Parkway Riverside – Original)

Alternative 4A was formed by combining preliminary alignments TL-7a (north segment) and 5 (south segment) (see **Tables 2-3** and **2-4**), with the mainlanes modified to six lanes throughout. From the IH-35E/SH-183 interchange, this alternative was proposed to travel southwest, passing over Commonwealth Drive and Irving Boulevard, reaching the Dallas Floodway in the area west of Hampton/Inwood Road. Alternative 4A split at this point, with the southbound lanes bridging across the Trinity River to the riverside face of the west levee and the northbound lanes remaining on the riverside face of the east levee. The alignment remained in a split configuration along the Dallas Floodway to a point just east of IH-35E, where the tollway would have transitioned back to a combined configuration with the southbound lanes crossing from the west levee to the east on a bridge structure. The joining of the southbound and northbound lanes occurred on the east levee near Corinth Street. East of Corinth Street, Alternative 4A followed the identical route to the US-175/SH-310 interchange as described for Alternatives 3A and 3B. As proposed, Alternative 4A was approximately 8.84 miles in length and would have required approximately 462 acres of ROW.

In the Dallas Floodway segment, the tollway would have been placed on earthen embankments, typically set above the 100-year flood level to provide appropriate protection against inundation. However, similar to Alternatives 3A and 3B, sections of the tollway would be depressed to underpass the existing bridge structures crossing the floodway. At these locations, a flood separation wall along the riverside of the tollway would be provided for 100-year flood protection. Alternative 4A would have required retaining walls to be placed on the levee-side of the tollway at depressed locations to accommodate the future levee raise under consideration.

2.3.1.4 Alternative 5 (Split Parkway – Landside)

Alternative 5 was formed by the combination of preliminary alignments TL-7c (north segment) and 5 (south segment) (see **Tables 2-3** and **2-4**), with the mainlanes modified to six lanes throughout.

This alternative was a split configuration, with its route very similar to Alternative 4A with the exception of being located on the landside of the river levees. The landside location had two notable effects on the tollway installation:

1. The embankment set against the landside of the east and west Dallas Floodway levees would have been installed with retaining walls along much of its landside edge to avoid spillover of fill material into adjacent drainage sumps and private property; and
2. The effects on local arterial streets would have been more pronounced, requiring rebuilding and raising of substantial lengths of these streets at points of crossing.

Alternative 5 was approximately 8.90 miles in length and required approximately 372 acres of ROW.

2.3.1.5 Reasons for Elimination of Alternatives

Alternatives 3A, 3B, 4A, and 5 were presented in the February 2005 DEIS as reasonable alternatives. In October 2006, the USACE Fort Worth District provided comments on a draft version of the SDEIS provided to the District in July 2006. In the comments, the USACE raised several concerns about the Trinity Parkway, specifically focusing on the Build Alternatives located in the Dallas Floodway as detailed in the February 2005 DEIS. The USACE expressed concern that these alternatives, as proposed, appeared to adversely impact operations and maintenance requirements within the Dallas Floodway. The USACE concerns are summarized as follows:

- The project must not interfere with the USACE's or City of Dallas' ability to operate and maintain the Dallas Floodway, conduct flood fighting activities, or restore or improve the flood damage reduction capability of the federal project.
- No cuts, flood separation walls, or retaining walls will be allowed that impact the existing or planned expansion of the Dallas Floodway or Dallas Floodway Extension levees.

The February 2009 SDEIS noted that the USACE considered Alternatives 3A, 3B, and 4A unapprovable. The USACE confirmed in subsequent correspondence that Alternatives 3A, 3B, and 4A, as well as Alternative 5, were not considered approvable due to the concerns outlined above (see **Appendix A-2**, Pages 12-15). For the reasons outlined above, these alternatives have been eliminated from further analysis and consideration, as authorized under CEQ and FHWA NEPA regulations (40 CFR Section 1502.14(a) and 23 CFR Section 771.123(c)).

The FHWA pursued further efforts to explore the feasibility of realigning or modifying Alternative 5 to address the USACE concerns in the course of developing the LSS (see **FEIS Appendix A-2**, Pages 16-18, 25-26, and 34-40). The evaluation involved shifting the mainlanes away from the levees and a limited analysis of potential impacts to provide the FHWA with quantitative data to support a decision regarding the viability of a modified version of Alternative 5. The analysis found that a shift away from the levees would result in impacts of extraordinary magnitude to minority and low-income neighborhoods and to existing bridges and buildings within the corridor, thereby preventing the project from achieving key elements of its purpose. Consequently, the FHWA determined that Alternative 5 could not be modified to avoid adverse impacts to the levees as identified by the USACE without causing an unreasonable level of collateral impacts (see **FEIS Appendix A-2**, Pages 50-51). Coordination with the USACE occurred throughout the decision making process that ultimately led to the FHWA's decision to withdraw Alternative 5 from further consideration.

2.3.2 Build Alternatives Under Consideration

Four Build Alternatives presented in the SDEIS and further evaluated in the LSS have been identified as candidates for addressing the basic need and purpose of the Trinity Parkway, which is to manage traffic congestion within the Trinity River Corridor. These are identified as Alternatives 2A, 2B, 3C, and 4B, and **FEIS Plate 2-1** at the end of this chapter shows the ROW footprint for the alternatives on an aerial photograph. As noted in **FEIS Section 2.0** and further discussed in **FEIS Section 2.8**, the FHWA recommends Alternative 3C for development to a higher level of detail both in terms of design refinement as well as impacts analysis. In accordance with 22 USC Section 139(f)(4)(D), this has been done to facilitate the development of mitigation measures and ensure compliance with applicable environmental laws such as Section 404 of the CWA. However, the FHWA has determined that developing Alternative 3C to a higher level of detail will not prevent an impartial decision with regard to all four Build Alternatives and the No-Build Alternative, and these alternatives remain under consideration within this FEIS. Accordingly, subsequent to the environmental review of this FEIS and consideration of comments from all sources, the FHWA will select one of the five alternatives under consideration in the anticipated ROD. **FEIS Plates 2-2** through **2-5** show the schematic plans and typical cross sections for these alternatives.

The level of design and other descriptive information presented in this chapter about the four Build Alternatives reflect the information that was developed as of the public hearing for the LSS in May 2012. Further details about the design characteristics and potential impacts of the Build Alternatives that the FHWA considered prior to designating a recommended alternative are found

in the SDEIS and LSS. The presentation of the alternatives, relative to the information available as of the time that the FHWA recommended Alternative 3C for further development, allows the evaluation of alternatives based on information developed at the same time and to an equivalent level of detail. This approach also facilitates the explanation of the analytical process and rationale behind Alternative 3C's recommendation that was made subsequent to the LSS public hearing.

Alternatives 2A and 2B were developed early in the study period and these alignments have remained unchanged in the absence of levee safety concerns from the USACE or other agencies; such as has been the case with alternatives located primarily within or adjacent to the Dallas Floodway. Alternatives 3C and 4B were added to the SDEIS based on agency consultation after the February 2005 publication of the DEIS. All of the Build Alternatives share common northern and southern termini. The northern terminus would be located at the Stemmons Freeway (IH-35E) interchange with John W. Carpenter Freeway (SH-183). The southern terminus would be at the US-175 interchange with SH-310. Alternatives 2A and 2B alignments generally run along Irving/Industrial Boulevard, whereas Alternatives 3C and 4B alignments generally run within the Dallas Floodway. All of the proposed Build Alternatives would be designated as controlled-access tollroads, with grade separations at crossings of existing highways and local arterial streets. Electronic Toll Collection (ETC) would be implemented for the Trinity Parkway to promote operational safety and efficiency. The facilities for toll collection would have a similar basic layout in each alternative, with mainlane toll gantries and ramp toll gantries in similar locations for each. These and other toll implementation issues are discussed in **FEIS Section 2.9**.

FEIS Sections 2.3.2.1 through **2.3.2.5** present descriptions of each Build Alternative under consideration, discussing the location of each with respect to key features of the natural and human environment. The overall length, estimated ROW, and estimated costs (in 2011 dollars) for each Build Alternative are summarized in **FEIS Section 2.4**.

2.3.2.1 Alternative 2A (Irving/Riverfront Boulevard - Elevated)

Alternative 2A was formed by the combination of *Trinity Parkway Corridor MTIS* alignments IND-1 (north segment) and 1 (south segment) (see **Tables 2-2** and **2-4**). Alignment IND-1 was modified to exclude two elevated HOV/HOT lanes shown in the MTIS. These lanes are now planned along the IH-35E Corridor. IND-1 was also narrowed (from eight lanes) in the northern segment to provide six mainlanes throughout. Alignment 1 (south segment) was modified from an at-grade

version in the MTIS to an elevated version. The concept represented by Alternative 2A was double-deck lanes comprised of tollway mainlanes elevated above an existing arterial street.

Alternative 2A would travel southwest from the IH-35E/SH-183 interchange, passing over Commonwealth Drive, and turning to the southeast to follow Irving Boulevard. The route would follow Irving/Riverfront Boulevard for approximately 5.6 miles, passing south of downtown to Corinth Street. In this segment, the tollway would be installed as a double-deck structure, above the existing city streets. Irving/Riverfront Boulevard would be almost totally reconstructed with this alternative to resolve conflicts with the supporting structures for the tollway above. The roadways would remain in service to serve local access and through traffic movement. South of Corinth Street, the route would follow a new alignment for approximately 1.2 miles, bending in an easterly direction to reach Lamar Street east of MLK, Jr. Boulevard. From this point, the route would travel southeast along Lamar Street as a double-deck structure, including an overpass of IH-45. The route then would turn east at Starks Street and follow it to the US-175/SH-310 interchange.

It should be noted Alternatives 2A and 2B would follow Lamar Street (MTIS Southern Alignment 1 – Lamar Street, see **Table 2-4**) south of Corinth Street, whereas Alternatives 3C and 4B would follow the levee of the proposed DFE (USACE, 1999) and the UP Railroad (MTIS Southern Alignment 5 – Combined East Levee/Railroad, see **Table 2-4**). MTIS Southern Alignment 1 was chosen in this area because it continues the same concept as used in the northern part of the corridor along Irving/Riverfront Boulevard (double-deck above an arterial street). As a practical matter, the southern ends of Alternatives 2A and 2B could follow the same southern segment route as used for Alternatives 3C and 4B.

Figure 2-4 shows a route map of the Alternative 2A alignment, **Figure 2-5** shows a computer-generated rendering of Alternative 2A, and **Figure 2-6** shows the typical design cross-section. **FEIS Plates 2-2 A and 2-2 B** at the end of this chapter provides the schematic plan.

FIGURE 2-4. LAYOUT MAP OF TRINITY PARKWAY ALTERNATIVE 2A

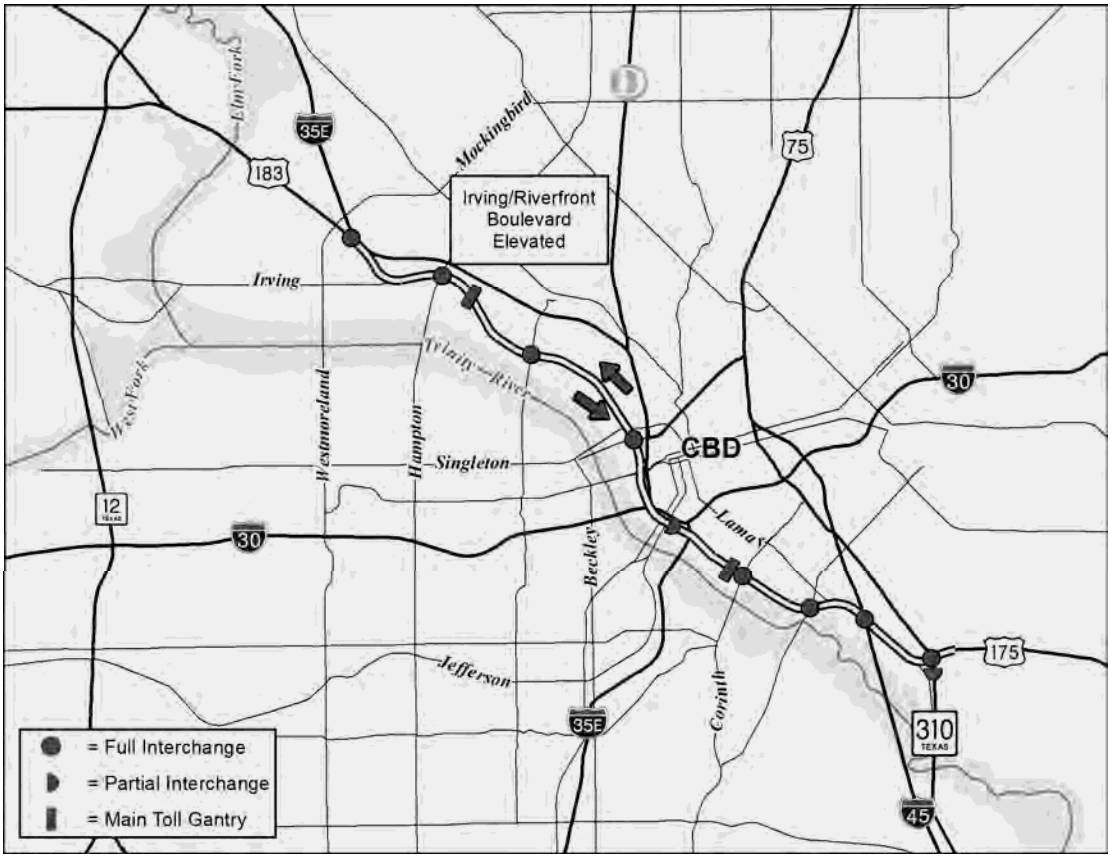


FIGURE 2-5. COMPUTER RENDERING OF ALTERNATIVE 2A

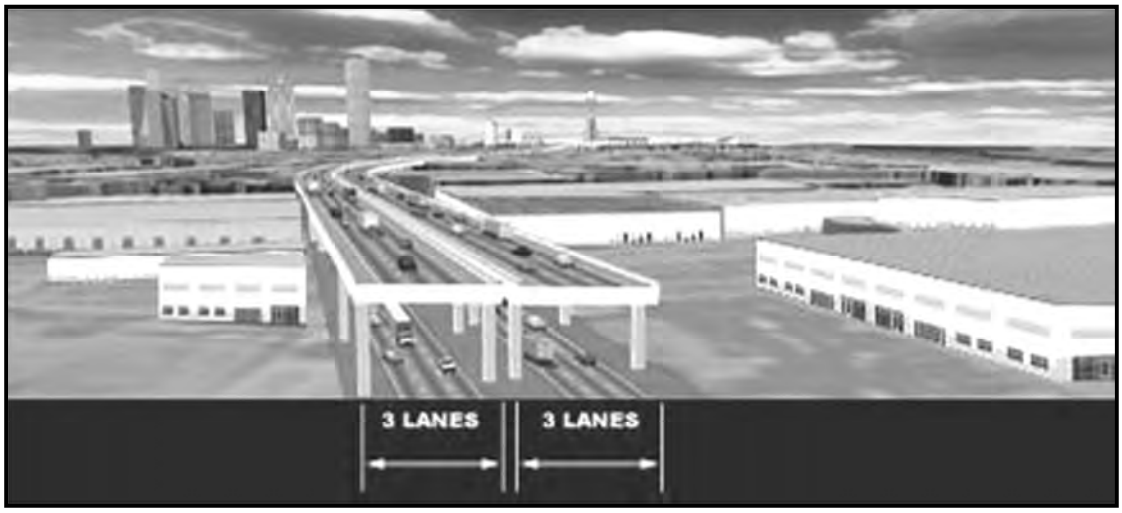
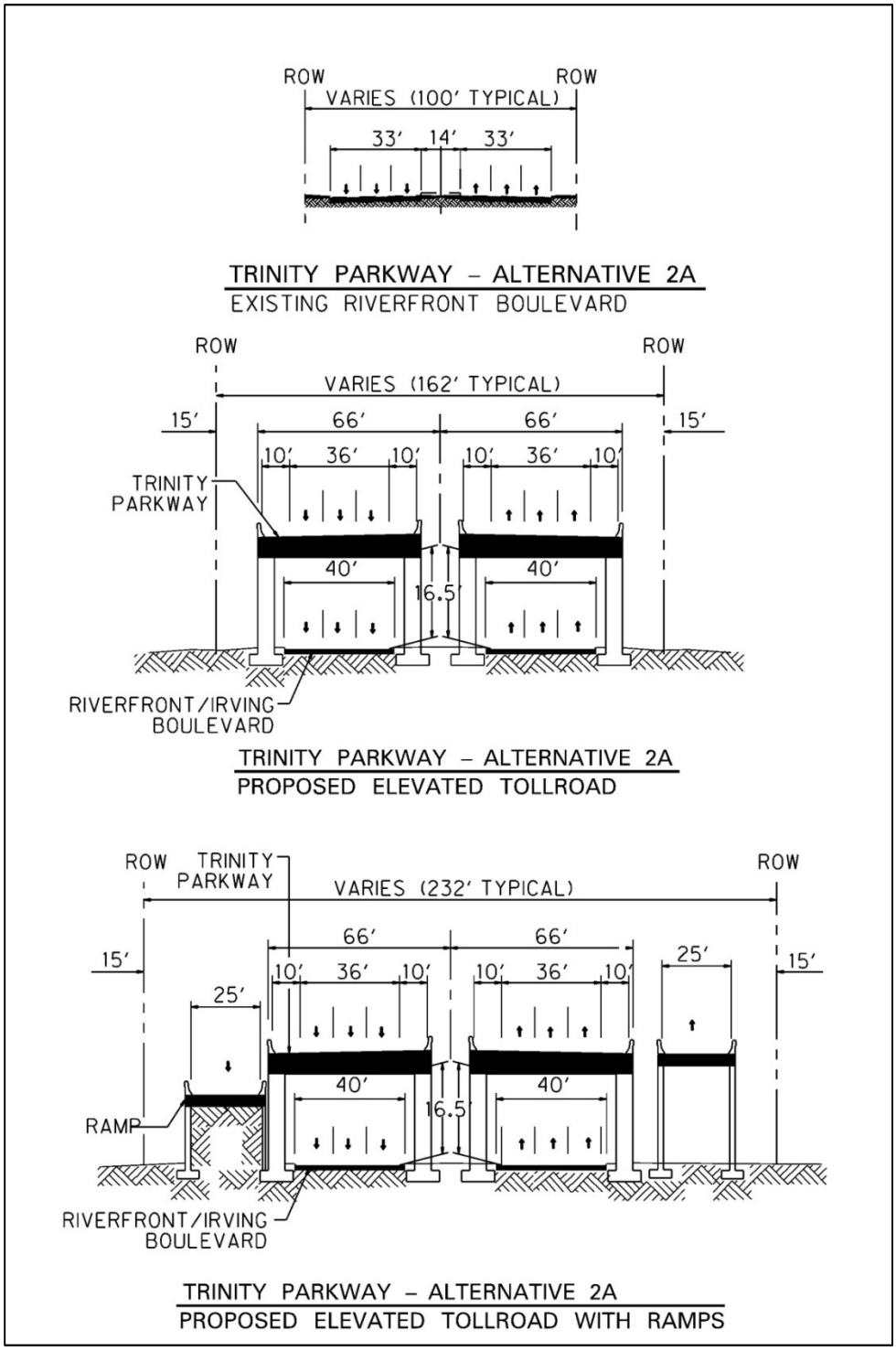


FIGURE 2-6. ALTERNATIVE 2A TYPICAL SECTIONS



Note: There would typically be three mainlanes of travel in each direction (six lanes total). Auxiliary lanes may be added in some segments, where required to properly accommodate merging areas between ramps.

There would typically be three lanes in each direction of travel (six lanes total) with the proposed tollway mainlanes, each 12 feet in width. The proposed ROW would vary depending on the need for ramps, the locations of ancillary buildings, and other geometric considerations. The width would typically be 162 feet in segments with mainlanes, but no ramps. The width would typically be 232 feet in segments where entry or exit ramps are present. In segments built as a double-deck over city streets, the tollway structure would be elevated to provide 16.5 feet of clearance above the pavement surface. A standard concrete traffic barrier would separate northbound and southbound traffic on the tollway mainlanes, and paved shoulders would be provided adjacent to the inside and outside lanes.

The existing ROW on Irving/Riverfront Boulevard is typically 100 feet in width. Substantial property acquisition would be needed because the proposed tollway is wider than the existing road, and because the tollway cannot precisely follow the existing centerlines of Irving/Riverfront Boulevard due to differences in design speed and curvature. Additional property acquisition would also be needed at specific locations due to the influence of ramps and ancillary buildings.

As discussed in the LSS, Alternative 2A would be approximately 8.83 miles in length, would require approximately 264 acres of ROW, and would cost approximately $2.36 billion (2011 dollars) to construct. Major interchanges associated with Alternative 2A would include:

- Direct connections at the IH-35E (Lower Stemmons)/SH-183 interchange (northern terminus), the US-175/SH-310 interchange (southern terminus), Woodall Rodgers Freeway, and IH-45;
- Full diamond interchanges at Hampton/Inwood Road, Sylvan/Wycliff Avenue, Corinth Street, MLK, and Lamar Street/SH-310; and
- Half diamond interchanges at the Houston/Jefferson Street Viaducts.

2.3.2.2 Alternative 2B (Irving/Riverfront Boulevard - At-Grade)

Alternative 2B was formed by the combination of the *Trinity Parkway Corridor MTIS* preliminary alignments IND-1 (north segment) and 1 (south segment) (see **Tables 2-2** and **2-4**). Alignment IND-1 was modified to be an at-grade facility and excludes two elevated HOV/HOT lanes, which are now planned along the IH-35E Corridor. Similar to Alternative 2A, the proposed facility was modified to six mainlanes throughout. The existing lanes on Irving/Riverfront Boulevard and Lamar Street would be replaced as access (frontage) roads. The location of this alignment would be similar to Alternative 2A.

Alternative 2B would travel southwest from the IH-35E/SH-183 interchange, passing over Commonwealth Drive, and turning to the southeast to follow Irving Boulevard. Similar to Alternative 2A, the route would follow Irving/Riverfront Boulevard for approximately 5.6 miles to Corinth Street. However, in this segment, the tollway would be installed predominantly at-grade, with service roads provided to make up for the loss of the arterial streets. One-way service roads on each side of the tollway would serve local access and through traffic. South of Corinth Street, the route would follow a new alignment for approximately 1.2 miles, bending in an easterly direction to reach Lamar Street east of MLK, Jr. Boulevard. From this point, the route would travel southeast along Lamar Street as a double-deck structure, identical to that proposed for Alternative 2A. The southern terminus of Alternative 2B would be the same as Alternative 2A, with the route following Starks Street to the US-175/SH-310 interchange. The same comment made above for Alternative 2A regarding use of the MTIS Southern Alignment 5 applies to Alternative 2B.

Figure 2-7 shows a route map of the Alternative 2B alignment, **Figure 2-8** shows a computer-generated rendering of Alternative 2B, and **Figure 2-9** shows the typical design cross-section. **FEIS Plates 2-3 A and 2-3 B** at the end of this chapter provides the schematic plan.

FIGURE 2-7. LAYOUT MAP OF TRINITY PARKWAY ALTERNATIVE 2B

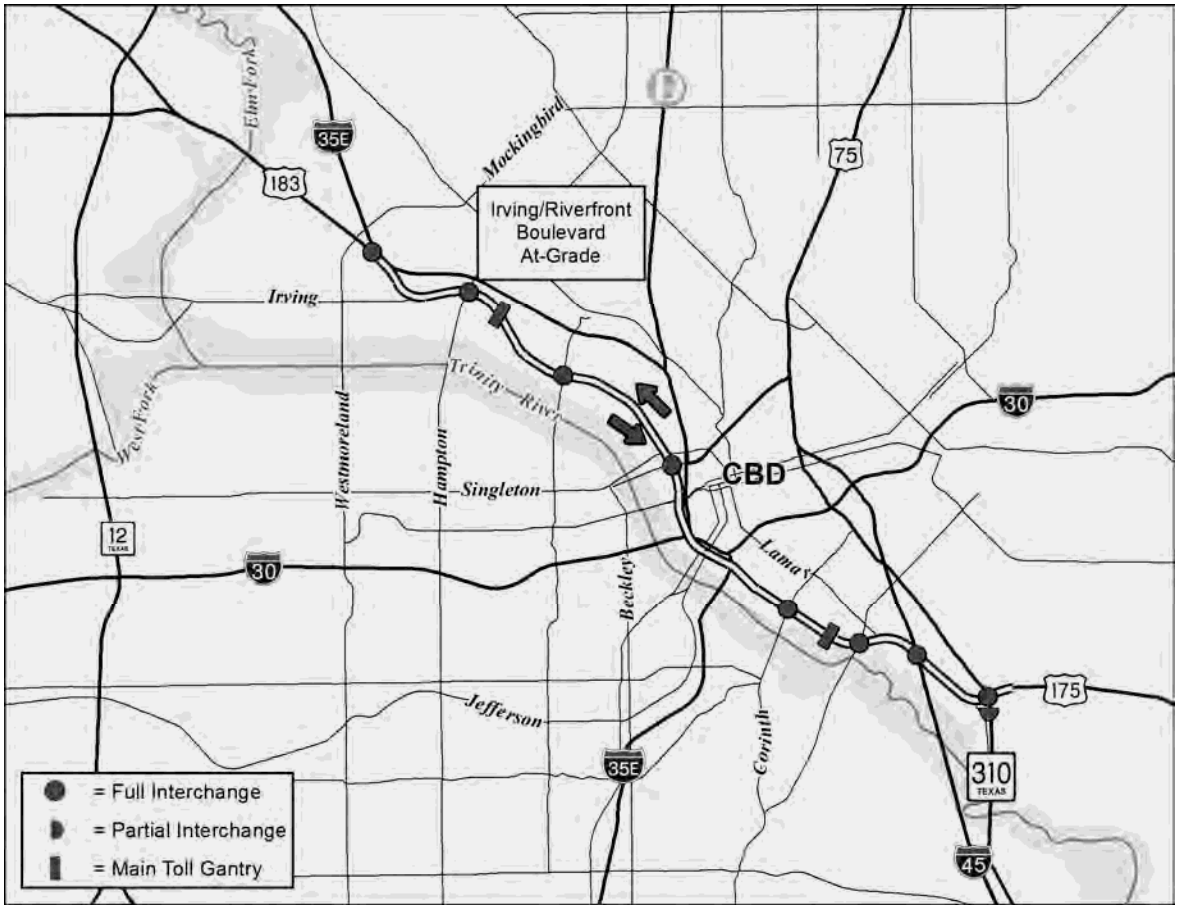
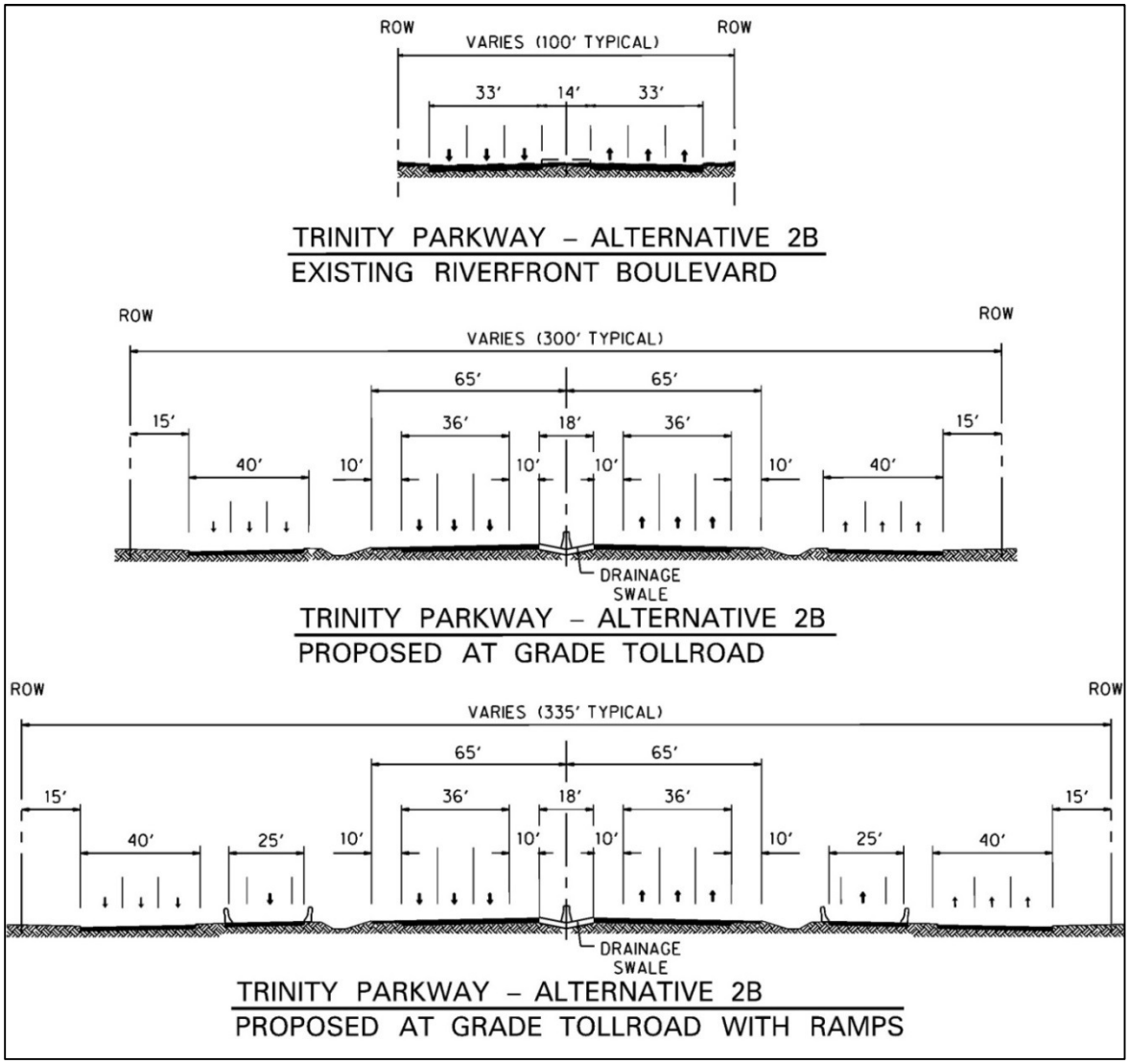


FIGURE 2-8. COMPUTER RENDERING OF ALTERNATIVE 2B

FIGURE 2-9. ALTERNATIVE 2B TYPICAL SECTIONS



Note: There would typically be three mainlanes of travel in each direction (six lanes total). Auxiliary lanes may be added in some segments, where required to properly accommodate merging areas between ramps.

There would typically be three lanes in each direction of travel (six lanes total) with the proposed tollway mainlanes, each 12 feet in width. The proposed ROW would vary depending on the need for ramps, the locations of ancillary buildings, and other geometric considerations. The width would typically be 300 feet in segments with mainlanes, but no ramps. The width would typically be 335 feet in segments where entry or exit ramps are present. The tollway would overpass city arterial streets along this segment with the structures elevated to provide 16.5 feet clearance above the pavement surface. A standard concrete traffic barrier would separate northbound and southbound traffic, and paved shoulders would be provided adjacent to the inside and outside lanes.

The existing ROW on Irving/Riverfront Boulevard is typically 100 feet in width. Substantial property acquisition would be needed because the proposed tollway would be wider than the existing road and because the tollway cannot precisely follow the existing centerlines of Irving/Riverfront Boulevard due to differences in design speed and curvature. Additional property acquisition would also be needed at specific locations due to the influence of ramps and ancillary buildings.

As discussed in the LSS, Alternative 2B would be approximately 8.83 miles in length, would require approximately 350 acres of ROW, and would cost approximately $1.87 billion (2011 dollars) to construct. Major interchanges associated with Alternative 2B would include:

- Direct connections at the IH-35E (Lower Stemmons)/SH-183 interchange (northern terminus), the US-175/SH-310 interchange (southern terminus), Woodall Rodgers Freeway, and IH-45;
- Full diamond interchanges at Hampton/Inwood Road, Sylvan/Wycliff Avenue, Corinth Street, MLK, and Lamar Street/SH-310; and
- A half diamond interchange at the Houston/Jefferson Street Viaducts.

2.3.2.3 Development History of Dallas Floodway Alternatives 3C and 4B

As previously discussed in **FEIS Section 2.3.1.5**, Dallas Floodway Alternatives 3A, 3B, 4A, and 5 were not considered approvable by the USACE Fort Worth District due to concerns about the effects of these alternatives on operations and maintenance requirements within the Dallas Floodway. The NTTA and the FHWA entered into consultation with the USACE and City of Dallas representatives through the fourth quarter of 2006 and first and second quarters of 2007 in attempts to resolve these concerns. However, the most substantial change made in response to the USACE consultation was the addition of two new Build Alternatives to the SDEIS, Alternative 3C (Combined Parkway - Further Modified) and Alternative 4B (Split Parkway - Riverside Modified). These alternatives were added because changes in the roadway layouts were required to address several of the USACE comments discussed in **FEIS Section 2.3.1.5.** The following summarizes the general roadway layout changes shared by both Alternatives 3C and 4B that were made to address USACE concerns regarding predecessor alternatives:

- Relocation of the tollway mainlanes in the area of downtown Dallas. Generally the tollway would be moved to the next available span under the cross street bridges, resulting in a shift of approximately 60 to 100 feet towards the river, to avoid the need for levee-side retaining walls.

- Ramps were deleted to Westmoreland Road to avoid possible adverse impacts to access and circulation for operation and maintenance (O&M), flood fighting, and surveillance.
- The Trinity Parkway lanes are elevated at the North Dallas Floodway Entry, the Woodall Rodgers Freeway connection (ramps), the Riverfront (formerly Industrial) Boulevard connection (ramps), the South Dallas Floodway Exit, and the IH-45 connection (ramps) to provide adequate vertical clearance over the levee top to allow City of Dallas service vehicles to underpass the structures.
- Given the number of pier penetrations in close proximity and parallel to the land side toe of the levee(s) at the Continental and Margaret Hunt Hill (MHH) Bridge connections, a reinforced concrete diaphragm wall was added (along the east levee for Alternative 3C, and along the east and west levees for Alternative 4B) to offset any potential negative effects of levee penetrations at this location. Diaphragm walls would be subject to design review and concurrence by the USACE, but conceptually they would be located on the riverside edge of the levee top using reinforced slurry wall techniques and would extend down to rock or unweathered shale to cut off possible under-seepage. The walls would reinforce the levee but would be considered secondary to the levee itself in the flood protection system. Similar to the wall design, construction phase details would be subject to the USACE concurrence.
- The levee-side ramps at diamond interchanges to existing cross-street bridges, such as Hampton and Sylvan Avenue, were reconfigured to move the ramps closer to the mainlanes so that they do not overlay the levee top. The ramps are now elevated using retaining walls and fill, in lieu of bridges, to avoid drill shaft penetrations of the levee.
- Longitudinal maintenance roads were replaced and reconnected in segments affected by the Trinity Parkway embankments.

2.3.2.4 Alternative 3C (Combined Parkway - Further Modified)

Alternative 3C was formed by combining the MTIS preliminary alignments TL-5a (north segment) and 5 (south segment) (see **Tables 2-3** and **2-4**), except that the mainlanes were modified to six lanes throughout. Alternative 3C, as described in the LSS, was also distinguished from earlier versions of a combined parkway riverside alternative (Alternatives 3A and 3B) by changes made in response to the USACE consultation beginning in Fall 2006 (see **FEIS Section 2.3.2.3**).

From the IH-35E/SH-183 interchange, Alternative 3C would travel southwest, passing over Commonwealth Drive and Irving Boulevard, reaching the Dallas Floodway in the area west of Hampton/Inwood Road. The Alternative 3C alignment would turn south along the riverside of the east Dallas Floodway levee, with the mainlanes placed on an earthen embankment typically set

above the 100-year flood level to provide appropriate protection against inundation. However, at points where the alignment would meet existing bridge crossings of the Dallas Floodway, the tollway would be depressed to pass under the existing structures. At these locations, a flood separation wall along the riverside of the tollway would be provided to protect the tollway from inundation during a 100-year flood event. Additionally, pump stations would be provided to drain the low points of the tollway at times that the Trinity River is in flood stage.

The median of the tollway in the northern floodway segment, north of Sylvan Avenue, would be of sufficient width to allow up to 5 feet of vertical difference in grades between the northbound and southbound lanes without the use of retaining walls. This feature would allow the northbound lanes to be elevated above the grade of the southbound lanes in some areas, allowing northbound vehicle occupants to see the Dallas Floodway area more readily. At a point roughly midway between Sylvan Avenue and Continental Avenue, the alignment along the east levee would turn slightly towards the river so that at Continental Avenue, the mainlanes would be approximately 100 feet further away from the levee. The increased offset from the levee would be maintained for approximately 3 miles down to the DART rail crossing, with the offset varying from 60 to 100 feet based on the actual locations of columns under the existing cross street bridges. Due to the increased offset, the proposed mainlanes would be moved sufficiently away from the face of the existing levee so that a proposed raising of the levee tops (under consideration by the City of Dallas and USACE as part of the Dallas Floodway Project, see **FEIS Section 1.6.1.2**) could be constructed without the need for retaining walls.

South of the DART Bridge, Alternative 3C would be built on structure and offset approximately 50 feet from the riverside edge of the future USACE DFE east levee extension (Lamar Levee) up to a location approximately 1,500 feet downstream of MLK, Jr. Boulevard. At this point, the Trinity Parkway would cross to the landside of the levee, with the mainlanes elevated sufficiently to allow 15-feet clearance over the levee top for maintenance/emergency vehicle access. The alignment would follow the landside of the future DFE east levee to IH-45, where it would pass under the mainlanes of the Interstate. The route would then turn east, pass over Lamar Street, and follow Starks Street to the US-175/SH-310 interchange.

Figure 2-10 shows a route map of the Alternative 3C alignment, **Figure 2-11** shows a computer-generated rendering of Alternative 3C, and **Figure 2-12** shows a typical design cross-section in the increased offset segment south of Sylvan Avenue. **FEIS Plates 2-4 A** and **2-4 B** at the end of this chapter provide an overview schematic plan of Alternative 3C as developed at the time of the LSS public hearing. Note that the typical section in **Figure 2-12** shows an existing 3.5:1 embankment slope on the riverside of the proposed roadway. The proposed Alternative 3C is

designed to accommodate the USACE-planned future 2-foot levee raise with a 4:1 levee slope. Embankments with 4:1 slopes are usual practice in highway and road installations in the North Texas region, including river crossings, which might be subject to periodic inundation. These relatively mild slopes have a high rate of success against failure in the soils of this region, even against surficial slides. Moreover, the USACE Fort Worth District, in a September 30, 2011 letter to the FHWA, acknowledged that the Trinity Parkway Project's assumption for future levee remediation by the USACE/City of Dallas (as part of the Dallas Floodway Project) of a two-foot levee raise with 4:1 riverside slopes appeared to be a reasonable assumption, based on the best available information (see **FEIS Section 2.7.1.1**).

FIGURE 2-10. LAYOUT MAP OF TRINITY PARKWAY ALTERNATIVE 3C

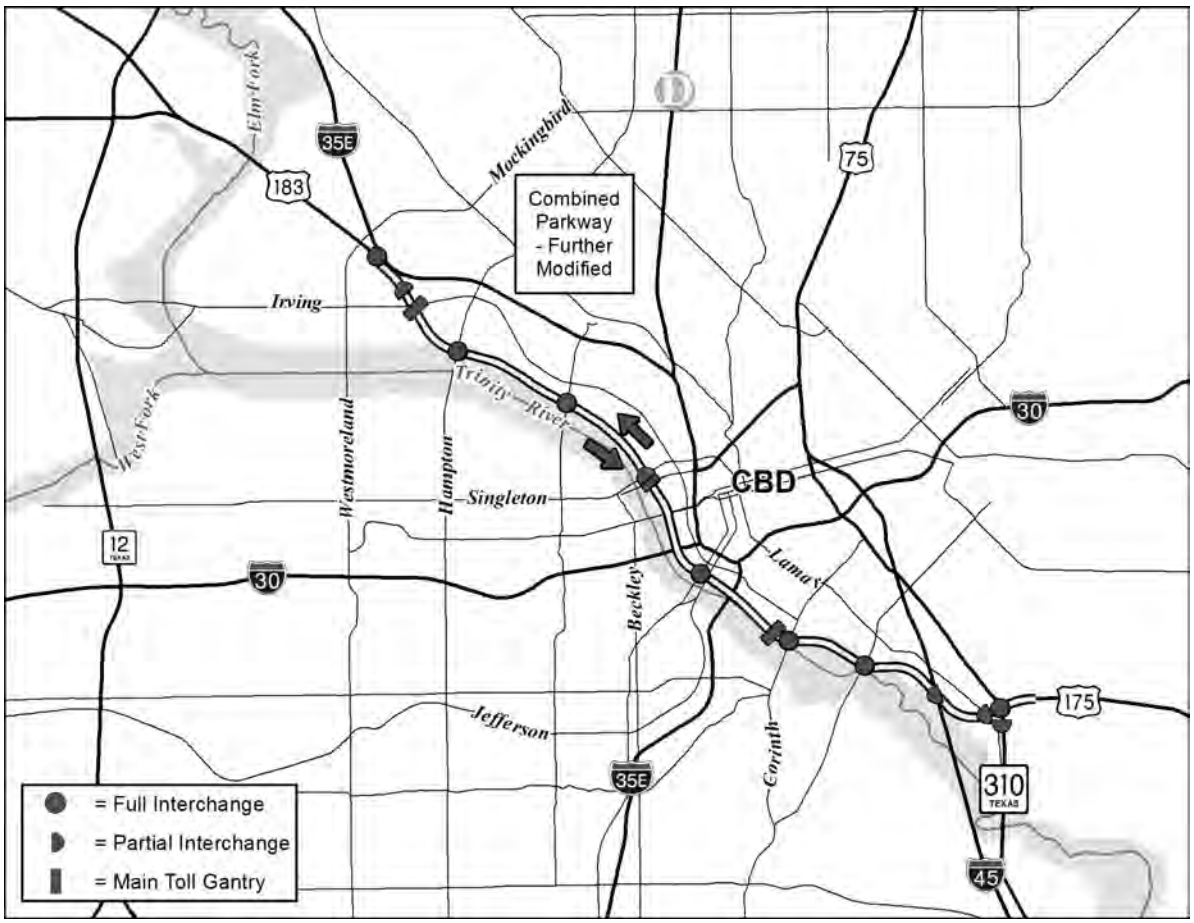
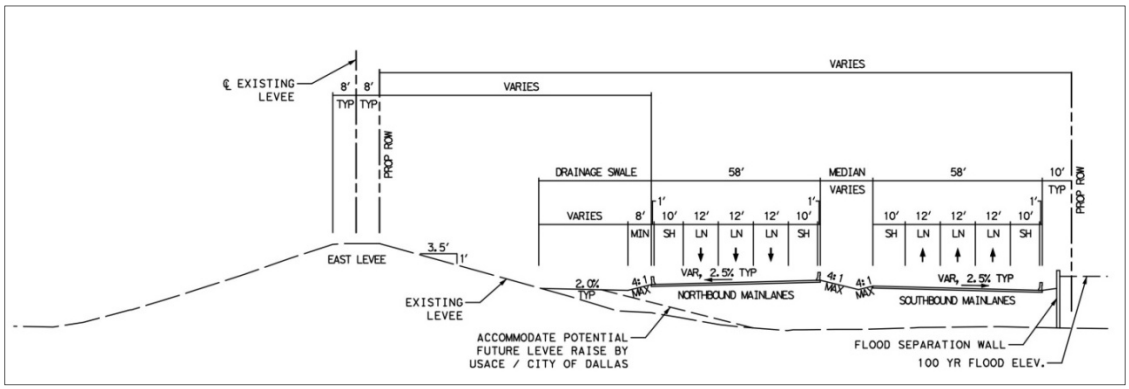


FIGURE 2-11. COMPUTER RENDERING OF ALTERNATIVE 3C

FIGURE 2-12. ALTERNATIVE 3C TYPICAL SECTION



Notes:

1. There would typically be three mainlanes of travel in each direction (six lanes total). Auxiliary lanes may be added in some segments, where required to properly accommodate merging areas between ramps. Flood elevations, levee heights, and slopes would vary. Those used in the section would be typical.
2. Modifications and improvements to existing levees would be performed by others.

The proposed tollway mainlanes would each be 12 feet in width. There would typically be three lanes in each direction of travel (six lanes total). Outside the Dallas Floodway, the tollway is proposed to be constructed on acquired ROW. The ROW width would vary depending on the extent of bridge structures, the need for ramps and service roads, the locations of ancillary buildings, and other geometric considerations (see the typical road cross sections on **FEIS Plate 2-4 A** and **2-4 B**, and typical floodway section in **FEIS Plate 2-4 C**). In the Dallas Floodway segment, the tollway operations area is proposed to be established by an agreement with the City of Dallas, rather than fee simple acquisition (see **FEIS Section 2.8.3**). Paved shoulders would be provided adjacent to the inside and outside of the mainlanes. The center median would typically

be protected on both sides by a standard concrete traffic barrier. In the segment near downtown Dallas, the inside shoulders would be reduced below the standard width of 10 feet in order to clear existing columns where the mainlanes would underpass the following historic bridges: Continental Avenue, Commerce Street, Corinth Street, and Houston Street (see **FEIS Section 3.3.1.4** regarding historic bridges).

Regarding roadway drainage, the northbound lanes of Alternative 3C would typically have flush shoulders with sheet flow drainage onto the adjacent grassed swales (see the typical sections on **FEIS Plates 2-4 A**, **2-4 B**, and **2-4 C**). Stormwater in these swales would be collected in inlets as needed and piped under the roadway out to discharge points at/near the riverside toe of the road embankments. The southbound lanes are expected to be partly drained by sheet flow over the shoulders and partly drained by inlet and pipe systems. In the normal (un-depressed) southbound lane segments on embankments, the water would sheet flow over the shoulders to the grassed embankment slopes. It is anticipated that a concrete flume would be built along the riverside toe of the embankment slopes to collect the stormwater to discharge points. In depressed segments under existing bridges, the flood separation wall (described above) would act as a curb and would contain the stormwater. In these segments, drainage inlets and pipes would be added as needed to control spread of stormwater onto the shoulders. As previously stated, pump stations are proposed at the sag points to collect and discharge stormwater from these depressed segments. All of the drainage discharge points for the northbound and southbound lanes would be coordinated with existing channels in the Dallas Floodway overbank.

As discussed in the LSS, Alternative 3C would be approximately 8.67 miles in length, would require approximately 379 acres of ROW and would cost approximately $1.42 billion (2011 dollars) to construct. Major interchanges associated with Alternative 3C would include:

- Direct connections at the IH-35E (Lower Stemmons)/SH-183 interchange (northern terminus), the US-175/SH-310 interchange (southern terminus), Woodall Rodgers Freeway (north side only), and IH-45;
- Full diamond interchanges at Hampton/Inwood Road, Sylvan/Wycliff Avenue, Houston/Jefferson Streets, MLK, and Lamar Street/SH-310;
- Half diamond interchanges at Commonwealth Drive, Continental Avenue, and Corinth Street; and
- Direct connection to the Corinth Street/Riverfront Boulevard intersection via a braided ramp pair originating in the area of MLK.

2.3.2.5 Alternative 4B (Split Parkway Riverside - Modified)

Alternative 4B was formed by the combination of preliminary alignments TL-7a (north segment) and 5 (south segment) (see **Tables 2-3** and **2-4**), with the mainlanes modified to six lanes throughout. Alternative 4B is distinguished from earlier versions of the split parkway on the riverside of the Dallas Floodway (Alternatives 4A) by changes made in response to the USACE consultation beginning in Fall 2006 (see **FEIS Section 2.3.2.3**).

From the IH-35E/SH-183 interchange, Alternative 4B would travel southwest, passing over Commonwealth Drive and Irving Boulevard, and reaching the Dallas Floodway in the area west of Hampton/Inwood Road. The mainlanes would be elevated at the crossing point of the Dallas Floodway levees to allow 15 feet vertical clearance between the low chord of the bridge structure and the top of future improved levee. This would result in the northbound mainlanes being elevated over the Hampton Road Bridge. Around the east levee crossing, Alternative 4B would split, with the southbound lanes bridging across the Trinity River to the riverside face of the west levee, and the northbound lanes remaining on the riverside face of the east levee. The alignment would remain in a split configuration along the Dallas Floodway to a point just east of IH-35E for a total split distance of approximately 5.4 miles.

In the Dallas Floodway segment, the tollway would be placed on earthen embankments, typically set above the 100-year flood level to provide appropriate protection against inundation. However, at points where the alignment would meet existing bridge crossings of the Dallas Floodway, the tollway would be depressed to underpass the existing structures. At these locations, a flood separation wall along the riverside of the tollway would be provided to protect the tollway from inundation during a 100-year flood event. Additionally, pump stations would be provided to drain the low points of the tollway at times that the Trinity River is in flood stage.

At a point roughly midway between Sylvan Avenue and Continental Avenue, the alignments of both the northbound and southbound lanes would turn slightly towards the river so that at Continental Avenue, the mainlanes would be approximately 100 feet further away from the levee. The increased offset from the levee would be maintained for approximately 3 miles down to the DART rail crossing, with the offset varying from 60 to 100 feet based on the actual locations of columns under the existing cross street bridges. Similar to Alternative 3C, the offset from the face of the existing levee would accommodate a future raising and flattening of levees under consideration by the City of Dallas and USACE (as part of the Dallas Floodway Project, see **FEIS Section 1.6.1.2**).

As stated above, the split configuration would end at a point east of IH-35E. The tollway would then transition back to a combined configuration with the southbound lanes crossing from the west levee to the east on a bridge structure. The joining of the southbound and northbound lanes would occur on the east levee near Corinth Street. East of Corinth Street, Alternative 4B would follow the identical route to the US-175/SH-310 interchange as described for Alternative 3C.

Figure 2-13 shows a route map of the Alternative 4B alignment, **Figure 2-14** shows a computer generated rendering of Alternative 4B, and **Figure 2-15** shows a typical design cross-section within the Dallas Floodway. **FEIS Plates 2-5 A and 2-5 B** at the end of this chapter provides the overview schematic plan. Note that the typical section in **Figure 2-15** shows an existing 3.5:1 embankment slope on the riverside of the proposed roadway (adjacent to both northbound and southbound lanes). The proposed Alternative 4B is designed to accommodate the USACE-planned future 2-foot levee raise with a 4:1 levee slope. Embankments with 4:1 slopes are usual practice in highway and road installations in the North Texas region, including river crossings, which might be subject to periodic inundation. These relatively mild slopes have a high rate of success against failure in the soils of this region, even against surficial slides. Moreover, the USACE Fort Worth District, in a September 30, 2011 letter to FHWA, acknowledged that the Trinity Parkway Project's assumption for future levee remediation by the USACE/City of Dallas (as part of the Dallas Floodway Project) of a two-foot levee raise with 4:1 riverside slopes appeared to be a reasonable assumption, based on the best available information (see **FEIS Section 2.7.1.1**).

FIGURE 2-13. LAYOUT MAP OF TRINITY PARKWAY ALTERNATIVE 4B

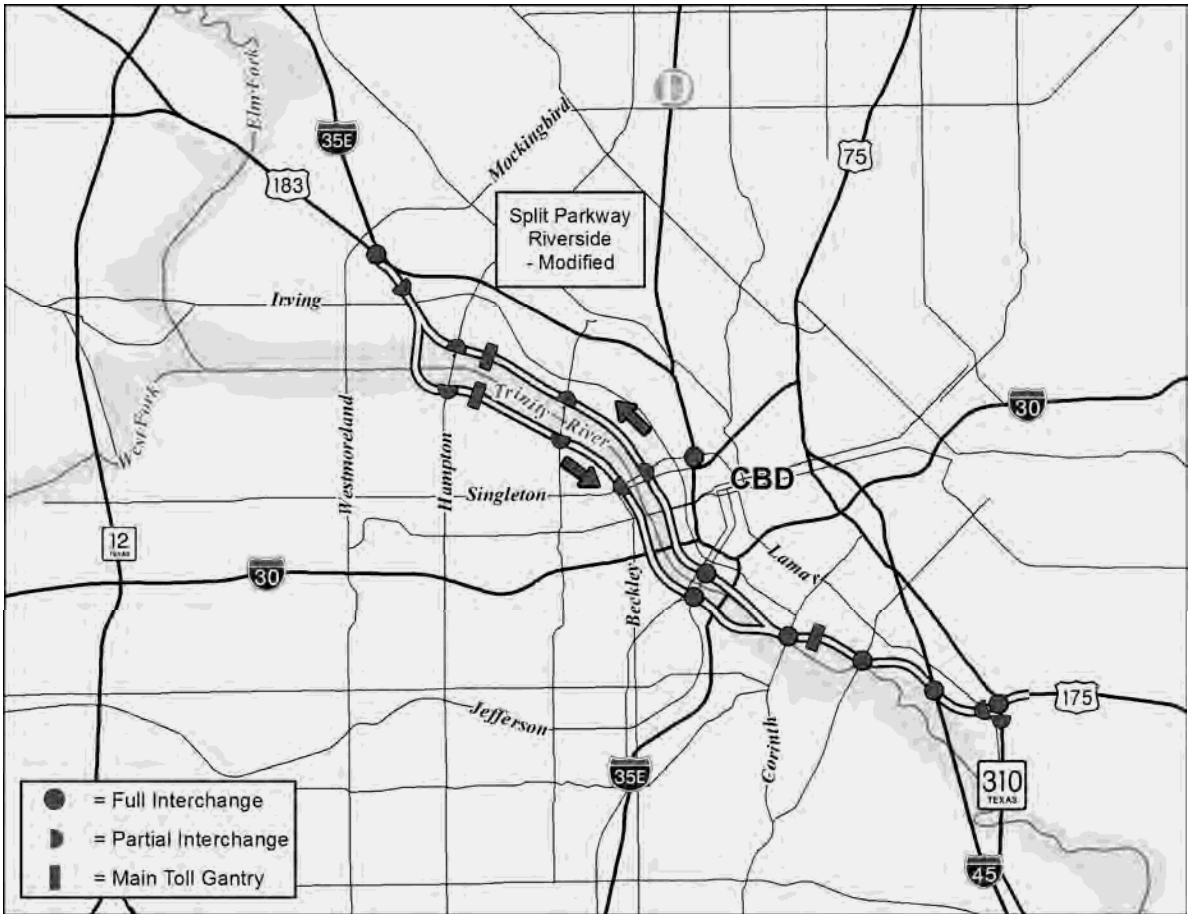
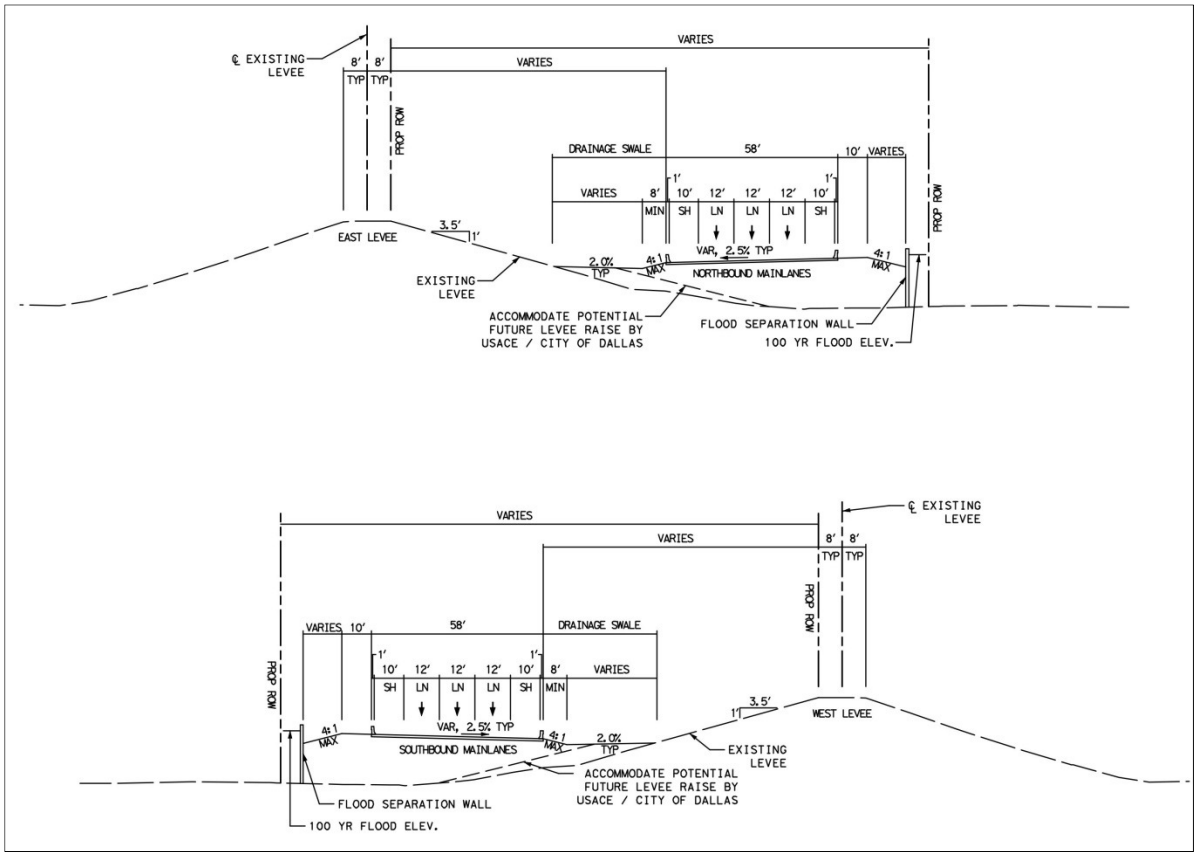


FIGURE 2-14. COMPUTER RENDERING OF ALTERNATIVE 4B (NORTHBOUND LANES)

FIGURE 2-15. ALTERNATIVE 4B TYPICAL SECTION



Notes:

1. There would typically be three lanes of travel in each direction (six lanes total) with the northbound lanes adjacent to the east levee and the southbound lanes adjacent to the west levee. Auxiliary lanes may be added in some segments, where required to properly accommodate merging areas between ramps. The west levee section would be similar to the east levee section.
2. Flood elevations, levee heights, and slopes would vary. Those used in the section would be typical.
3. Modifications and improvements to existing levees would be performed by others.

The proposed tollway mainlanes would each be 12 feet in width. There would typically be three lanes in each direction of travel (six lanes total). The proposed ROW would vary depending on the need for ramps, the locations of ancillary buildings, and other geometric considerations. In the Dallas Floodway segment, the width would typically be 246 feet for each direction of travel (492 feet total), measured from the crest of each levee to the toe of the tollway embankment (note that the width includes some levee slopes, which may ultimately be the responsibility of the City of Dallas or USACE, rather than NTTA). In the downtown segment, the width would expand to approximately 300 feet per side, 600 feet total. In long segments on structure, the ROW width would typically be 180 feet for a dual-direction tollway and 100 feet (per direction) for a single-direction tollway (see the typical road cross sections on **FEIS Plates 2-5 A** and **2-5 B**, and typical

floodway section in **FEIS Plate 2-5 C**). A standard concrete traffic barrier would separate northbound and southbound traffic in areas of opposing traffic. Paved shoulders would be provided adjacent to the inside and outside lanes. In split segments, the center median area would be protected by a standard concrete traffic barrier. Additionally, in split segments, a 20-foot drainage swale would be located on the levee side of the tollway.

Regarding roadway drainage, the northbound and southbound lanes of Alternative 4B would typically have flush shoulders, adjacent to the Dallas Floodway levees, with sheet flow drainage onto grassed swales (see the typical sections on **FEIS Plates 2-5 A**, **2-5 B**, and **2-5 C**). Stormwater in these swales would be collected in inlets as needed and piped under the roadway out to discharge points at/near the riverside toe of the road embankments. In super-elevated sections, the lanes would cross-fall towards the riverside edge rather than towards the levee. These segments are expected to be partly drained by sheet flow over the shoulders and partly drained by inlet and pipe systems. In the normal (un-depressed) segments on embankments, the stormwater would sheet flow over the shoulders to the grassed embankment slopes. It is anticipated that a concrete flume would be built along the riverside toe of the embankment slopes to collect the stormwater to discharge points. In depressed segments under existing bridges, the flood separation wall (described above) would act as a curb and would contain the stormwater. In these segments, drainage inlets and pipes would be added as needed to control spread of stormwater onto the shoulders. Pump stations are proposed at the sag points to collect and discharge stormwater from these depressed segments. All of the drainage discharge points for the northbound and southbound lanes would be coordinated with existing channels in the Dallas Floodway overbank.

As discussed in the LSS, Alternative 4B would be approximately 8.84 miles in length, would require approximately 490 acres of ROW, and would cost approximately $1.45 billion (2011 dollars) to construct. Major interchanges associated with Alternative 4B include:

- Direct connections at the IH-35E (Lower Stemmons)/SH-183 interchange (northern terminus), the US-175/SH-310 interchange (southern terminus), Woodall Rodgers Freeway, and IH-45;
- Full diamond interchanges at Hampton/Inwood Road, Sylvan/Wycliff Avenue, Houston/Jefferson Streets, Corinth Street, MLK, and Lamar Street/SH-310;
- Half diamond interchanges at Commonwealth Drive, Continental Avenue, and Commerce Street.

2.4 SUMMARY OF ENGINEERING CONSIDERATIONS

2.4.1 Comparison of Alternatives

A summary of the total length, ROW requirement, and cost estimates (2011 dollars) for each of the Build Alternatives is provided in **Table 2-5**, based on the description of the alternatives in the LSS. Estimates are based on full build-out of each alternative. The proposed tollway costs include ROW acquisition, utility relocations, construction (e.g., roadway, drainage, toll gantries, maintenance facilities, 20 percent contingencies, environmental mitigation), and agency-related costs.

TABLE 2-5. TOTAL LENGTH, ROW, AND ESTIMATED COSTS [1,2]

Trinity Parkway Alternative	Length (Miles)	Estimated ROW [3] (Acres)	Estimated ROW and Utility Cost (Million $)	Estimated Construction Cost (Billion $) [4,5]	Estimated Agency Cost (Million $)[6]	Estimated Total Cost (Billion $)[7]
1 (No-Build)	---	---	---	---	---	---
2A	8.83	264	601 M	1.393 B	355 M	2.360 B
2B	8.83	350	520 M	1.066 B	272 M	1.868 B
3C	8.67	379	142 M	1.007 B	257 M	1.416 B
4B	8.84	490	103 M	1.067 B	272 M	1.452 B

Notes:

1. Costs shown in 2011 dollars for all Build Alternatives.
2. All project costs rounded to millions (M) or billions (B). Project costs are expected to increase in future years due to inflation.
3. See discussion in **FEIS Section 2.4.2** regarding ROW considerations.
4. Includes 20 percent contingencies
5. Includes costs associated with environmental mitigation.
6. Agency Cost includes the costs associated with design, planning, and administration of construction activities such as program management, final design, surveying, ROW acquisition consultant, and construction support services (see **LSS Appendix D**).
7. Includes approximately $10 million for ITS costs and contingencies for each Build Alternative

In addition to cost estimates presented in **Table 2-5**, exploratory level cost estimates for annual O&M expenditures were included in the SDEIS for the Trinity Parkway Build Alternatives. O&M costs were estimated over a feasibility study 52-year period based on standard NTTA O&M practices. The 52-year time frame is tied to the statutory limit of concession projects in Texas State law of 55 years, including project development; for cost estimating purposes, a three-year development/construction period was assumed, thus leaving 52 years for the O&M phase. The estimated O&M cost for Alternative 2A is $78 million (2008 dollars), for Alternative 2B is $233 million (2008 dollars), for Alternative 3C is $233 million (2008 dollars), and for Alternative 4B is $227 million (2008 dollars) (see **SDEIS Section 6.5**).

2.4.2 ROW Considerations

As indicated in **Table 2-5**, the estimated ROW requirements for the Trinity Parkway Build Alternatives range from 264 acres for Alternative 2A to 490 acres for Alternative 4B. The majority of new ROW required for Alternatives 2A and 2B would be acquired from commercial/light-industrial properties and residential properties. Similarly, segments of Alternatives 3C and 4B outside of the Dallas Floodway would be on acquired ROW. However, segments of Alternatives 3C and 4B within the Dallas Floodway would be on land owned and maintained by the City of Dallas. In these segments, the roadway is expected to be covered by an operating agreement with the city rather than fee-simple acquisition. In concept, the agreement would provide NTTA suitable access rights to construct and maintain the toll road, while at the same time maintaining the primacy of the city's flood control function (see also **FEIS Section 2.8.3).** In accordance with 23 CFR 710.201(e), the agreement regarding access rights (in whatever form it takes) would establish a real property interest for the roadway project adequate for the construction, operation, and maintenance of the resulting facility and for the protection of both the facility and the traveling public. Depending on the alternative selected by the FHWA in the anticipated ROD, the City of Dallas may allow use of Dallas Floodway land necessary for Trinity Parkway at no cost. However, for planning purposes, the ROW costs developed for the Build Alternatives include the estimated value, based on Dallas Central Appraisal District property values, of any Dallas Floodway land needed for the roadway.

2.5 ACCESS CONSIDERATIONS

The following sections provide a summary of other design considerations that apply to some or all of the Trinity Parkway Build Alternatives as discussed in **SDEIS Chapter 2**. These considerations generally apply to the project objective of providing compatibility with local development plans stated in **FEIS Section 1.5**.

2.5.1 Access to IH-35E (South R.L. Thornton Freeway)

A design option involving access to IH-35E (South R.L. Thornton Freeway) was considered for each of the Trinity Parkway Build Alternatives and discussed in SDEIS **Section 2.3.12**. As part of their 1997 resolution of endorsement for the *Trinity Parkway Corridor MTIS*, the Dallas City Council requested that access to IH-35E be considered during the DEIS (Dallas City Council Resolution No. 972918, dated September 10, 1997) (City of Dallas, 1997a). This request was also made during the scoping phase for the DEIS, notably by representatives of the Oak Cliff (West Dallas) community and towns/cities in the south-west portion of Dallas County, such as

Duncanville and Cedar Hill. This issue had been partially addressed during the MTIS, in which design options were developed to fully connect IH-30 and IH-35E via the Trinity Parkway. The consensus at the time was that direct connections should be provided in the Mixmaster area and via the Trinity Parkway. Full multi-directional connections could not practically be provided at both proposed signature structures at IH-30 and IH-35E because of geometric and cost considerations as well as potential adverse visual, socioeconomic, and environmental impacts.

The IH-35E interchange poses design and operational challenges for all of the Build Alternatives. As part of the IH-35E access studies for the DEIS, it was determined that direct connecting ramps were not feasible for Alternatives 2A and 2B because of geometric constraints. For Alternatives 3C and 4B, eastbound Trinity Parkway to southbound IH-35E and northbound IH-35E to westbound Trinity Parkway connections were evaluated and several different ramp options were considered for these connections. Due to geometric constraints and concerns about visual impacts in the Dallas Floodway area, the ramp layouts at IH-35E were of lower capacity than directional flyovers, which might otherwise be expected for freeway-to-freeway movements. In summary, a direct connection was feasible for the northbound-to-westbound movement, which was comprised of a loop ramp or U-turn located at the north end of the IH-35E Bridge across the Dallas Floodway. This ramp crossed the East Dallas Floodway levee at grade in the area of Houston Street and would have required gates and an elevated bridge section to assure access for City of Dallas operations staff and vehicles. The eastbound-to-southbound movement was provided at the Houston/Jefferson Street Bridges (signalized interchanges were necessary, depending on the option), with a southbound ramp connecting to the IH-35E frontage road at Colorado Boulevard (see **SDEIS Section 2.3.12** for details on the various options explored).

2.5.2 Other Interchange Access Locations

In addition to the proposed interchange connection at IH-35E discussed in **FEIS Section 2.5.1**, each of the Trinity Parkway Build Alternatives includes proposed interchange connections with other major freeways and arterials in the project area. Interchanges were provided at strategic locations along the mainlanes of each Build Alternative. Criteria for location selection of interchanges includes characteristics such as functional classification of the intersecting roadway; traffic volumes along the intersecting roadway; and linkage with communities, recreational areas, employment areas, and potential economic development areas. **Table 2-6** provides a comparison of interchange access points proposed for each of the alternatives considered, as set out in **SDEIS Section 2.3.12**.

TABLE 2-6. INTERCHANGE ACCESS COMPARISON

Interchange Location	Trinity Parkway Alternatives				
	1 (No-Build)	2A	2B	3C	4B
At IH-35E/SH-183	---	Direct Connection via Ramps	Direct Connection via Ramps	Direct Connection via Ramps	Direct Connection via Ramps
At Commonwealth	---	None	None	Half Diamond Interchange	Half Diamond Interchange
At Hampton/Inwood	---	Full Diamond Interchange	Full Diamond Interchange	Full Diamond Interchange	Full Diamond Interchange
At Wycliff/Sylvan	---	Full Diamond Interchange	Full Diamond Interchange	Full Diamond Interchange	Full Diamond Interchange
At Continental	---	None	None	Half Diamond Interchange	None
At Woodall Rodgers	---	Direct Connections SB-EB, WB-NB, NB-EB, and WB-SB	Direct Connections SB-EB, WB-NB, NB-EB, and WB-SB	Direct Connections SB-EB and WB-EB	Direct Connections SB-EB and WB-EB
At Commerce	---	None	None	None	None
At Houston/Jefferson	---	Half Diamond Interchange	Half Diamond Interchange	Full Diamond Interchange	Full Diamond Interchange
At IH-35E	---	None	None	Connection via Ramps NB-WB and EB-SB	Connection via Ramps NB-WB and EB-SB
At Corinth	---	Full Diamond Interchange	Full Diamond Interchange	Half Diamond Interchange	Full Diamond Interchange
At MLK	---	Full Diamond Interchange	Full Diamond Interchange	Full Diamond Interchange	Full Diamond Interchange
At IH-45	---	Direct Connection via Ramps	Direct Connection via Ramps	Direct Connection via Ramps	Direct Connection via Ramps
At Lamar	---	None	None	Half Diamond Interchange	Half Diamond Interchange
At SH-310	---	Half Diamond Interchange	Half Diamond Interchange	Half Diamond Interchange	Half Diamond Interchange
At US-175	---	Direct Mainlane Connection	Direct Mainlane Connection	Direct Mainlane Connection	Direct Mainlane Connection

Source: SDEIS Table 2-6.
Notes: NB = Northbound; SB = Southbound; WB = Westbound; EB = Eastbound.

2.5.3 Design Speed and Vehicular Park Access

The design concept adopted in the *Trinity Parkway Corridor MTIS* (based on a tax-supported road) was a low-speed parkway, with a design speed of 50 mph and a posted speed limit of 45 mph. The toll-supported version of the road considered in the DEIS, SDEIS, LSS, and this FEIS is proposed to have a design speed of 60 mph and a posted speed limit of 55 mph (see **SDEIS Section 2.4.2**). The speeds are proposed to be raised to generate more attractive timesaving on the tollway versus the other available thoroughfares and freeways in the corridor. Timesaving is a value-added benefit of a toll facility and is a major consideration in a driver's decision to pay for a trip on a toll road. The change in speed is considered a prerequisite to consideration of this facility as a toll road.

An impact of the increase in speed on the tollway would be the removal of left exits, which were previously discussed in the MTIS as possible access routes to the Trinity Park (the MTIS discussed these exits only in relation to alternative TL-7a, which was the original version of the Split Parkway Riverside). Permanent left exits are not appropriate on a high-speed facility, and therefore they have been replaced with access points from adjacent arterial streets at several cross-street bridges in the Dallas Floodway. Typical park access point locations as presented in the Trinity River Corridor MIP are shown on **FEIS Plate 2-6**.

As described in **FEIS Section 1.6.1.2** (see also **SDEIS Section 2.4.1**), the City of Dallas has proposed an extensive development of recreational facilities and lakes (i.e., Trinity Park) in the Dallas Floodway. Future park access roads originally planned by the City of Dallas could be affected by implementation of either Alternatives 3C or 4B in the Dallas Floodway. In order to ensure that access is provided to Trinity Park if Alternative 3C or 4B is constructed, structured ramps from the Trinity Parkway alignment into the floodplain at five access locations have been proposed. These five access locations include Hampton Road, Sylvan Avenue, the proposed Jefferson Memorial Bridge, Corinth Street/Riverfront Boulevard, and Cedar Crest/MLK, Jr. Boulevard; these access locations are shown in **FEIS Plates 2-4** and **2-5**. Ramps of this kind would mitigate any cost impact to the City of Dallas for park access.

In an additional effort to facilitate park enjoyment, a pedestrian platform overlooking the lakes and park at Reunion Boulevard is planned as part of the Trinity River Corridor. This overlook platform can be seen in the schematic designs for all of the Build Alternatives (see **FEIS Plates 2-2 B, 2-3 B, 2-4 B, and 2-5 B**). The locations of the aforementioned five park access locations and pedestrian platform generally correspond to the recommendations for park access locations as presented in the Trinity River Corridor MIP (see **FEIS Plate 2-6**) (City of Dallas, 1997a).

2.5.4 Bicycle/Pedestrian Facilities and Park Access

The Trinity River Corridor contains a number of proposed bicycle/pedestrian trails, most of which are located off-road on locations such as the Dallas Floodway levees, drainage sumps, and existing rail ROW. The proposed tollroad would make allowance for suitable crossings for these bicycle facilities (listed in **SDEIS Section 3.3.2.3**) under or over the roadway at appropriate crossing points. In the event that a bicycle facility is in place prior to the construction of the tollroad, the bicycle facility would be suitably reconstructed in the area of the tollroad to maintain its continuity and function.

Future bicycle/pedestrian access points to the planned Trinity Park from adjacent neighborhoods that were originally planned by the City of Dallas as part of the BVP could be affected by implementation of either Alternative 3C or 4B in the Dallas Floodway. Accordingly, bicycle/pedestrian access would be provided by Alternatives 3C and 4B using underpasses (using existing drainage channels) and overpasses of the Trinity Parkway mainlanes.

2.5.5 Federal Approval for Access to Interstate System

Approval from the FHWA is required for any new access points to the Interstate system (23 U.S.C. Section 111) as Interstate Highways are intended to provide uninterrupted flow and access is limited to approved ramp locations. All of the Build Alternatives would require the NTTA to submit appropriate documentation for the FHWA to request access points for interchange locations. However, such action would not be taken until after the FHWA has recommended an alternative for development to a higher level of detail. Prior to selecting a Build Alternative in its ROD for the Trinity Parkway, the FHWA would either need to approve Interstate access or would need to ascertain that there is reasonable assurance that such approval may be obtained.

2.5.6 Access Roads

In most areas, the Trinity Parkway would be constructed as mainlanes only without access roads. Access to the mainlanes would be controlled, meaning that vehicles may enter and exit the roadway only at designated on- and off-ramps. However, in certain areas the location of the roadway ROW may sever access to particular parcels of land, leaving no other means of property access. In these instances, access roads may be constructed to restore property access, or, otherwise, the affected property may be acquired or the affected property owner compensated. As discussed in **SDEIS Section 2.4.4**, the locations of access roads for the Build Alternatives are

included on the schematic plans at the end of this chapter (see **FEIS Plates 2-2 [A-B]** through **2-5 [A-B]**). Access (frontage) roads would be used extensively in Alternative 2B to restore access from Irving/Riverfront Boulevard. Use of access roads on the other alternatives would be limited.

2.6 TOLL ROAD IMPLEMENTATION ISSUES

The following sections describe issues associated with the proposal to fund the proposed Trinity Parkway as a toll road, as discussed in **SDEIS Section 2.5**. It should be noted that the financial plan for the facility has not been developed in final detail at this time. The exact contribution of revenue bonds to the total cost of the project would be developed at a future date after an anticipated ROD is issued by the FHWA. The bond contribution would also be based on an Investment Grade Traffic Study, as well as the advice of bond counsel and other professionals retained by the NTTA in regards to raising funds by a public offering.

2.6.1 Toll Road Justification

The proposed action is being planned for implementation as a limited-access toll facility with NTTA as the local sponsor. The toll road designation for the Trinity Parkway is made for funding purposes. Developing a highway as a toll road can typically save both time and money. The use of toll-financed revenue bonds, which are sold to private investors at competitive interest rates, would allow a project to be funded much more quickly than one that has to compete for limited tax dollars. Substantial cost savings can also be achieved by avoiding the inflationary effect resulting from years of deferred completion.

In light of TxDOT funding constraints, implementing the proposed action as a toll road would provide a needed funding mechanism and would accelerate the project schedule. This would allow the project to satisfy the need and purpose (see **FEIS Chapter 1**) sooner than if implemented as a TxDOT project. Further, a portion of the revenues from tolls would be used to provide full maintenance and operation of the roadway, freeing TxDOT from this on-going funding obligation.

Experience in the DFW region demonstrates the advantages of a toll road financing approach versus conventional funding. An example is the conversion of SH-190 in suburban north Dallas to the President George Bush Turnpike (PGBT). By 1995, TxDOT had estimated that 31 years and a total of $317 million had been invested in the development of SH-190. TxDOT estimated it would still need an additional $397 million to complete the project and that it would likely be the year 2015 before SH-190 could be completed using conventional funding methods. By turning

the project over to the TTA (predecessor to NTTA), TxDOT estimated that the full highway would be built by 2003 at a cost savings to the state of $292 million. This decision was taken in the context of funding shortfalls, which are still affecting the ability of TxDOT to proceed with needed projects and to operate and maintain existing facilities. For instance, at the time of the SH-190 decision, the TxDOT Dallas District Office was facing a $9.4 billion revenue deficiency for transportation projects included in their *Mobility 2010* program (NCTCOG, 1990).

The RTC, City of Dallas, Dallas County, and Dallas Regional Mobility Coalition (DRMC) have endorsed the development of the Trinity Parkway as a toll road. This decision is intended to fulfill the project's need and purpose within the shortest possible time, and to provide an income stream to help fund initial construction and long-term O&M costs. The imposition of tolls may result in less daily traffic on the Trinity Parkway compared to a toll-free (tax-supported) highway. As a result, other corridor roadways may experience slightly higher daily traffic volumes than if the project were to be non-tolled. However, toll roads in urban areas are expected to perform well in peak traffic periods, when they can provide a faster and more cost-effective route for congested commuter traffic. This would tend to make the peak period traffic volumes on the Trinity Parkway more comparable to a non-toll alternative. Since the peak periods are the most critical times for performance of the regional transportation system and since congestion in these periods is a major factor in air quality issues, the overall performance of the toll road option is judged to be comparable to a non-toll option, and the toll option therefore meets the stated need and purpose of the project. To evaluate the effects of proposed expansion of the regional priced facility system in the Dallas-Fort Worth region based on the improvements included in *Mobility 2035 – 2013 Update*, which includes the Trinity Parkway, NCTCOG performed a regional tolling analysis reported in a technical memorandum that can be viewed at *www.nctcog.org/mobility2035*. A summary of the regional tolling analysis is presented in **FEIS Section 4.27**.

2.6.2 Electronic Toll Collection

2.6.2.1 Toll Collection Facilities

Another aspect of the toll road designation is the requirement to incorporate toll collection facilities into the ROW. The purpose of these facilities is to provide a means of collecting tolls to financially support the construction, operation, and maintenance of the toll road. Various methods of toll collection have been considered for the Trinity Parkway. The NTTA Board directed (August 2007) that future facilities, including the proposed Trinity Parkway, implement ETC to promote operational safety and efficiency. This means that cash would not be accepted

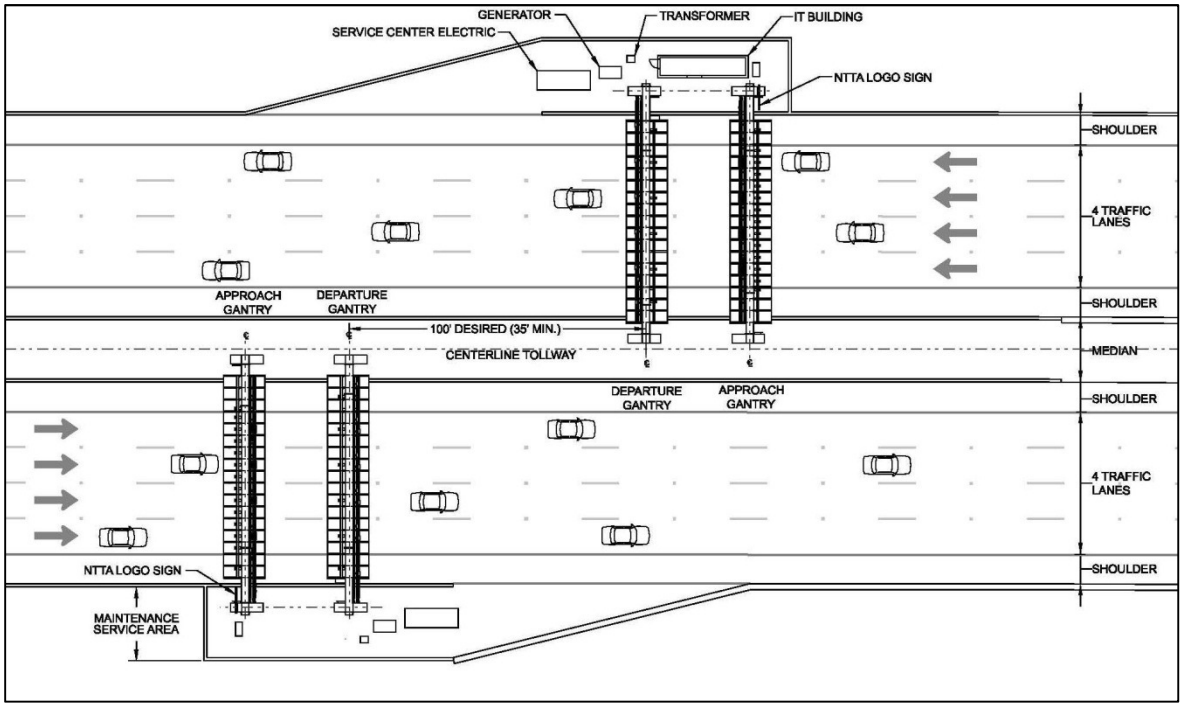
while driving on the Trinity Parkway. ETC gantries are designed to be safe and convenient for the motorist and consist of little more than a structural frame over the roadway lanes.

The ETC system relies primarily on automatic vehicle identification (AVI) technology. In Texas, most of the AVI applications to date are based on installation of Radio Frequency Identification (RFID) tags inside vehicles, such as the TollTag® used by NTTA, TxTag® used by TxDOT, and EZ TAG® used by the Harris County Toll Road Authority (HCTRA). All of the Texas tags are interoperable, meaning a Texas driver need only maintain one tag to use all of the Texas agency toll roads. With an ETC system, motorists pass through electronic readers, without stopping, and are automatically assessed a toll charge. Recent advances have allowed AVI systems to accommodate non-tagged vehicles, through use of Automatic License Plate Recognition (ALPR). For ALPR applications, license plates are photographed and scanned by computers. This "video billing" program, also known as ZipCash® with the NTTA, allows motorists to travel the tolled lanes without needing a transponder and without needing to stop and pay (NTTA, 2013c). When the toll fee associated with the license plate has reached a designated level, NTTA would send a ZipCash® invoice to the address associated with that license plate. The ZipCash® method of payment is discussed in more detail in **FEIS Section 2.6.2.2**.

In December 2010, the NTTA completed its conversion to all ETC technology. This conversion has been followed by continued construction work necessary for existing toll roads to operate ETC technology (e.g., toll booth removal and installation of new pavement markings and signage). NTTA has installed this ETC system on its existing roadways, including the DNT, Sam Rayburn Tollway (SRT), President George Bush Turnpike (PGBT), Addison Airport Toll Tunnel, and Mountain Creek Lake Bridge. TxDOT and HCTRA have used RFID tags supplemented with ALPR to create ETC tollroads where there are no change booths. Westpark Tollway in Houston and SH-130 in Austin are also examples of ETC tollroads (NTTA, 2013a).

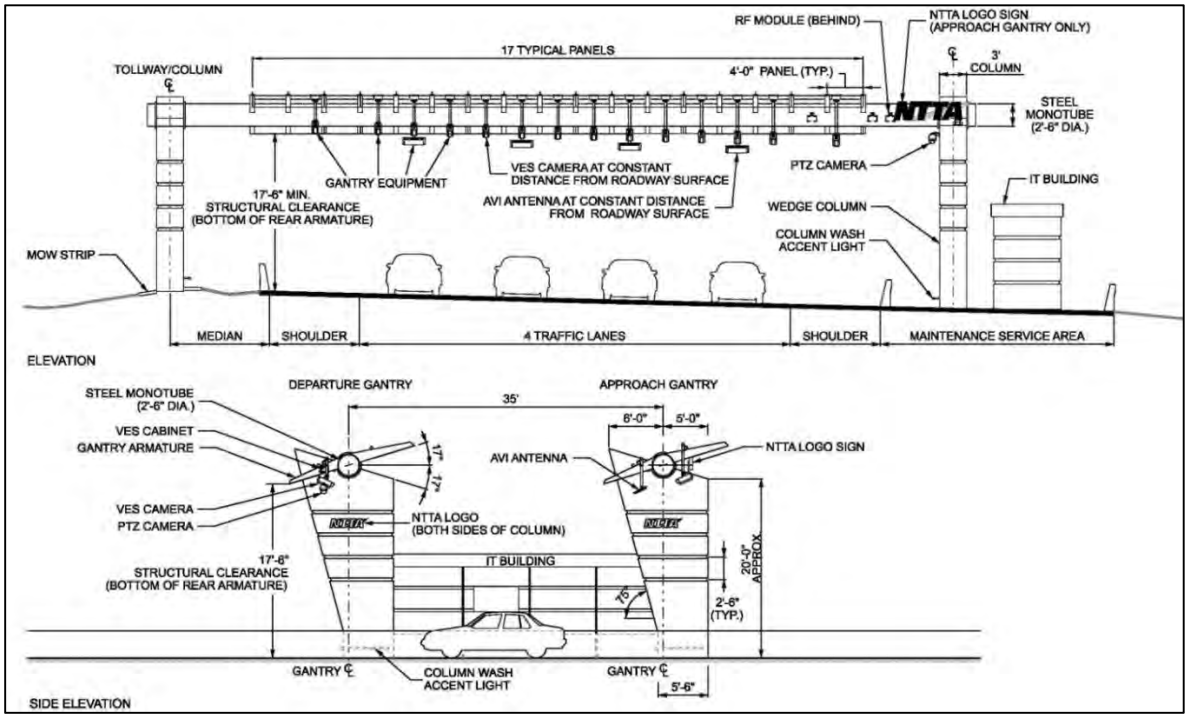
Figures 2-16 (plan view) and **2-17** (side view) present drawings of an ETC multiple-lane main toll gantry. This is typically unattended. The drawings and typical layouts are shown for conceptual purposes only. The actual design of the toll collection facilities may differ from that depicted and would be subject to engineering and other considerations at the actual site.

FIGURE 2-16. TYPICAL PLAN VIEW - ETC MULTIPLE-LANE TOLL GANTRY



Source: NTTA, 2012. Drawings are conceptual only and subject to change during final design.

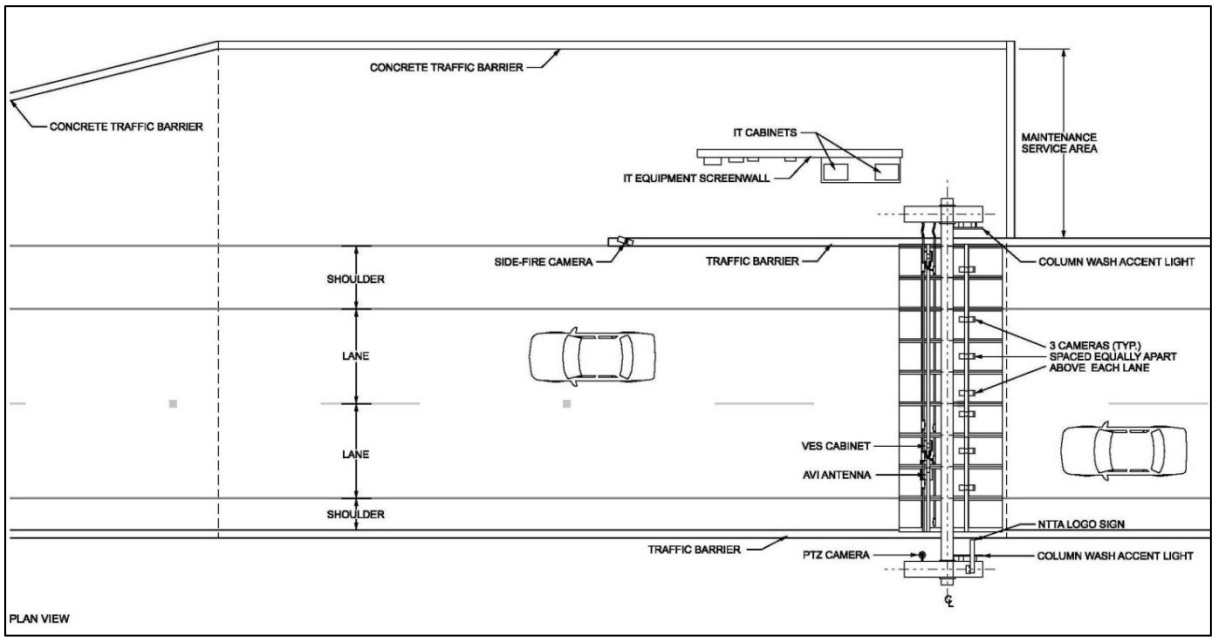
FIGURE 2-17. TYPICAL SIDE VIEW – ETC MULTIPLE-LANE TOLL GANTRY



Source: NTTA, 2012. Drawings are conceptual only and subject to change during final design.

Figure 2-18 is a plan-view drawing of an ETC ramp toll gantry. This is also typically unattended.

FIGURE 2-18. TYPICAL PLAN VIEW - ETC RAMP TOLL GANTRY



Source: NTTA, 2012. Drawings are conceptual only and subject to change during final design.

The NTTA has identified tentative locations of proposed toll gantries for the Trinity Parkway Build Alternatives. These locations, shown on **FEIS Plates 2-2 (A-B)** through **2-5 (A-B)** at the end of this chapter, are preliminary and subject to change during final design. It is notable that the most southern mainlane toll gantry for all of the Build Alternatives occurs northwest of IH-45. This allows non-tolled movements between IH-45 and the US-175/SH-310 intersection at the south project terminus. Vehicles on the mainlanes would be assessed a toll at this gantry located northwest of IH-45.

In addition, it should be noted that NTTA strives to incorporate the principles of context-sensitive solutions (CSS) in their toll facilities (**FEIS Chapter 5** provides additional details concerning CSS). Using this approach, architectural treatments for toll facilities are varied (within budgetary constraints) to provide designs appropriate to the physical setting and neighboring features. NTTA also published in 2009 the *Trinity Parkway Design Criteria Manual* (DCM), showing enhanced architectural, signage, and landscaping standards to be incorporated, when applicable, to the proposed project. See **FEIS Plates 4-3 (A-C)** for examples of design and landscaping enhancements proposed for the Trinity Parkway (note that such enhancements are subject to change in final design Plans, Specifications and Estimates [PS&E]).

2.6.2.2 Methods of Toll Collection and Payment

NTTA would offer two methods to obtain an active toll tag account (NTTA TollTag® "credit user" and "cash user" accounts) and a method that would allow motorists without an active toll account to accrue electronic toll charges in the form of mailed monthly statements (NTTAs ZipCash®). For those who maintain an active toll account, the Dallas area TollTag®, TxTag® stickers, and the Houston area EZ TAG® would be accepted on the proposed Trinity Parkway facility. As further described below, cash payment options would be available for each payment method; however, users who maintain prepaid accounts would benefit from reduced toll rates. Toll rates would be approximately 50 percent higher for drivers who do not have an electronic toll transponder to offset administrative costs related to processing the license plate information associated with ZipCash® and payment collection.

With a TollTag® prepaid "credit user" account, the driver would pay an installment fee through a credit or debit card. The account would then be established with a credit, which would be reduced each time the transponder passes through an operating toll gantry. When the driver's account reaches a minimum required balance, the "credit user's" credit or debit card would again be charged a standard fee to automatically increase the available balance. Should the "credit user" lose or fail to surrender the TollTag® when the account is closed, the credit or debit card would be charged $25 to cover the cost of the transponder. Note that although some NTTA customers still utilize TollTag® transponders, NTTA began transitioning in 2008 to the use of TollTag® stickers. For those who choose to maintain a prepaid "cash user" account, a minimum payment would be required to establish the account. The prepaid "cash user" account would require the driver to maintain sufficient funds in the account to cover incurred toll charges. Toll rates would be the same as "credit user" account toll rates.

The TollTag® may only be displayed in the vehicle specifically assigned to that TollTag®. Regardless of the user type, TollTag® accounts may be monitored free of charge via the internet. Should the user request a monthly invoice, a $1.50 charge would be incurred each month. TollTag® account payments may be made by cash, check, money order, or credit card. TollTag® "cash user" accounts may be established and payments may be submitted in person at the NTTA Customer Service Center (5900 West Plano Parkway, Suite 200, Plano, TX 75093) or at various retail locations partnered with NTTA such as ACE Cash Express (TollTag® distribution locations available at www.NTTA.org). In addition, the NTTA would also offer the convenience of making a payment by phone with a credit card (NTTA, 2013d).

ZipCash® is a "drive through now, pay later" initiative provided by the NTTA for those without a TollTag® account, and is similar to TxDOT's "Pay By Mail" process. Customers without a toll transponder account who travel through the gantry would have a photograph taken of their license plate. When the toll fee associated with the license plate has reached a designated level, NTTA would send a ZipCash® invoice to the address associated with that license plate. Effective September 1, 2011 (under Senate Bill 469), the ZipCash® billing cycle is as follows (NTTA, 2011b):

1. ZipCash® Invoice: The customer would have 30 days to pay the invoice. As previously mentioned, the toll rate reflected on the ZipCash® invoice would be the normal cash rate, which is approximately 50 percent more than the rate for TollTag® users, reflecting the higher cost of processing (Note: "Pay by Mail" toll rates are one-third more than TxTag® rates on Central Texas toll roads operated and maintained by TxDOT, and a $1.15 fee is also applied to each monthly bill for non-tag customers).
2. "First Notice of Nonpayment": Failure to pay the ZipCash® invoice results in the issuance of a "First Notice of Nonpayment" by NTTA. The customer would have a 30 days to pay all tolls plus a $10 administrative fee per invoice (Note: a $5.00 administrative fee is added to each transaction on a TxDOT "Pay By Mail" account receiving a "Notice of Toll Violation" for unpaid tolls).
3. "Second Notice of Nonpayment": Failure to pay the "First Notice of Nonpayment" results in the issuance of a "Second Notice of Nonpayment." The customer would have 30 days to pay all tolls, the previous $10 administrative fee per invoice, and an additional administrative fee of $25 (Note: non-payment within 30 days of a "Notice of Toll Violation" on a TxDOT "Pay By Mail" account results in removal of the $5.00 administrative fee and the transaction is sent to a collection agency).
4. Collections Service/"Third Notice of Nonpayment" – Continued failure to pay results in the debt's escalation to a Collections Service where the customer would be responsible for paying all tolls and administrative fees accrued to this point, plus all collection service fees.
5. Citation/Court – In addition to all previous tolls, fees, and collection service fees, a customer would be responsible for all court costs and fines as provided by law.

Bilingual (English and Spanish) information on payment methods is available on the NTTA (www.ntta.org) and TxDOT (www.TxTag.org) websites and over the phone (Customer Service Centers).

Comparisons of the above described payment methods and toll pricing are presented in **FEIS Section 4.3.2.2**.

2.6.3 Traffic Modeling - Toll Based

This section presents toll based traffic modeling provided by the NCTCOG in 2007, which allows a comparison of anticipated traffic volume for the four Build Alternatives under consideration. The estimated 2030 average daily weekday volumes for the Build Alternatives are modeled in accordance with *Mobility 2030*, which was the current MTP at the time of the original toll based traffic modeling. The results of the NCTCOG traffic modeling are shown in **Figure 2-19** (Alternatives 2A/2B), **Figure 2-20** (Alternative 3C), and **Figure 2-21** (Alternative 4B). Each of these figures contains small rectangles across each Build Alternative's mainlanes and ramps indicating the tentative locations of toll gantries as of the time that traffic modeling was performed.

FIGURE 2-19. ESTIMATED 2030 AVERAGE WEEKDAY VOLUMES - ALTERNATIVES 2A/2B

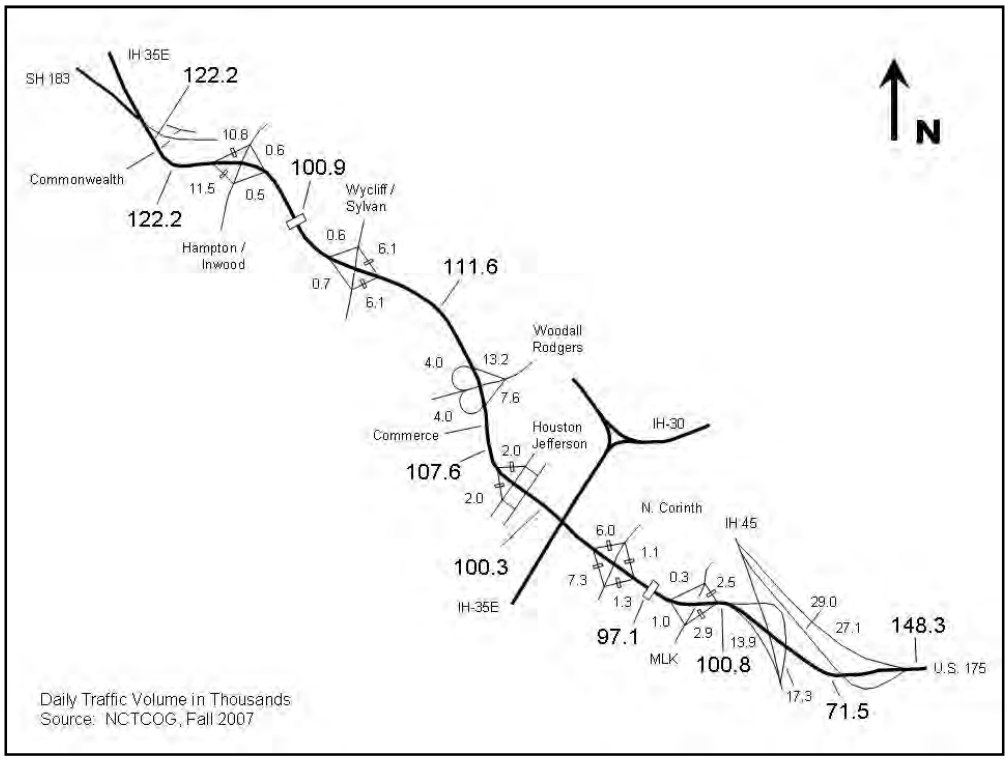


FIGURE 2-20. ESTIMATED 2030 AVERAGE WEEKDAY VOLUMES – ALTERNATIVE 3C

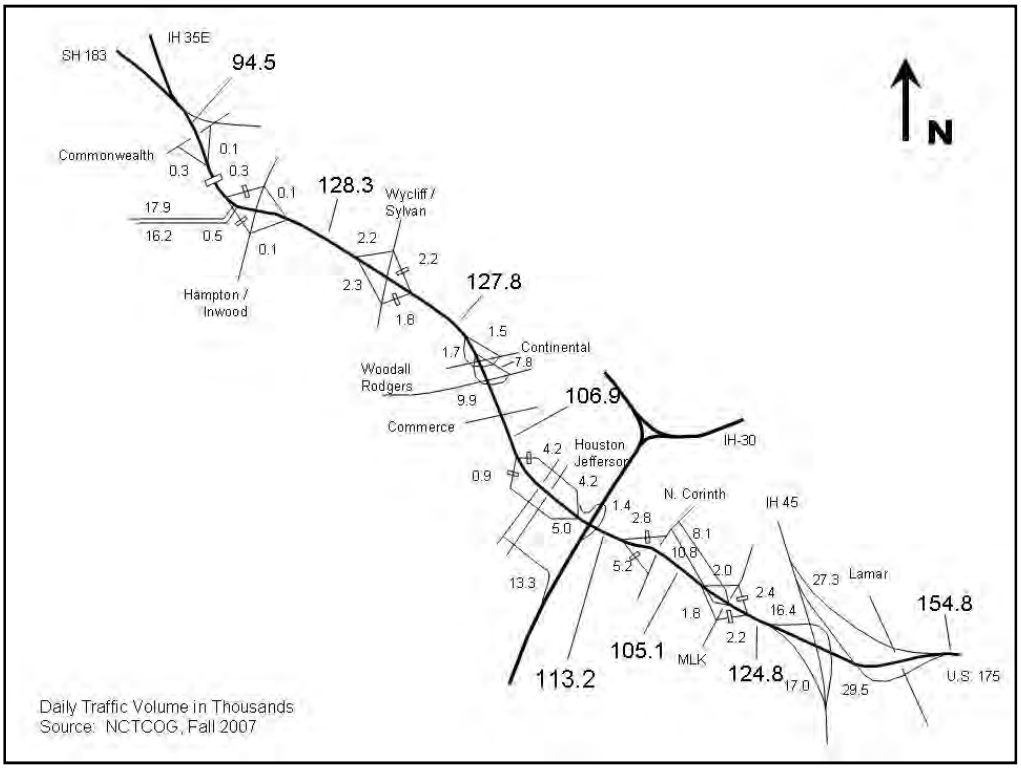
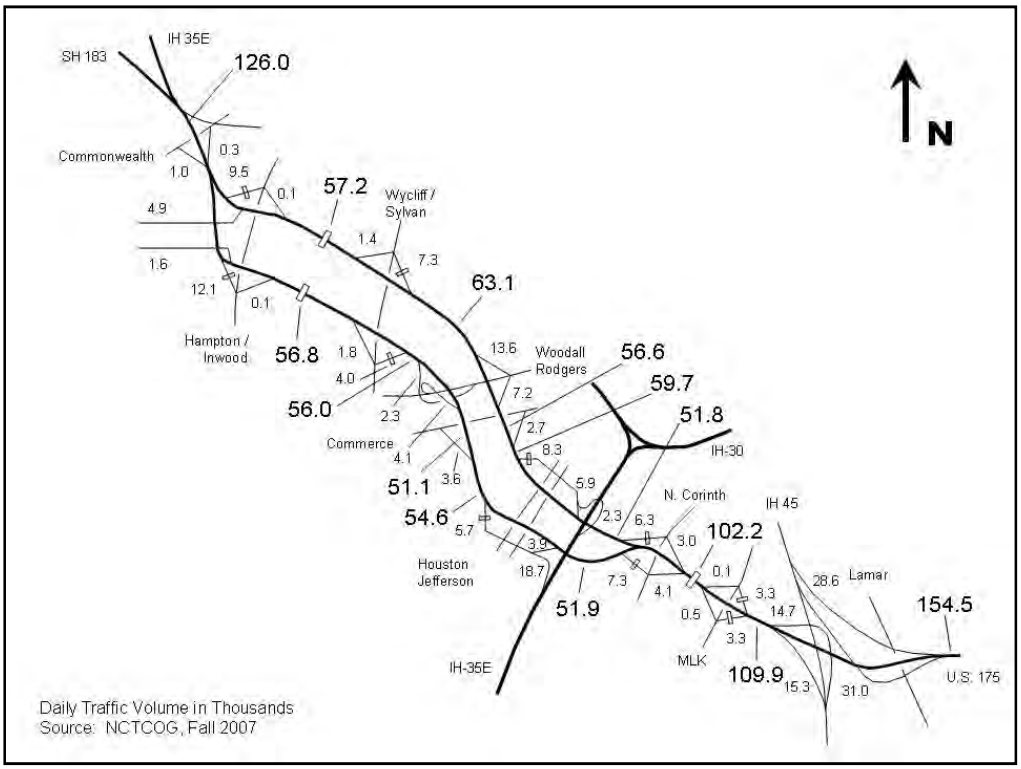


FIGURE 2-21. ESTIMATED 2030 AVERAGE WEEKDAY VOLUMES - ALTERNATIVE 4B



Figures 2-19 through **2-21** (2030 traffic volumes for all Build Alternatives) show some differences in traffic volumes between the roadway alternatives, but these differences do not appear substantial enough to draw trends. There appear to be some localized effects due to access points and tolls, but overall, the traffic numbers are fairly consistent between alternatives.

2.6.4 Tolling Requirements

Pursuant to 23 U.S.C. Section 129(a)(3) and the MAP-21, federal-aid highway funds can be used for the construction of, or improvements to, "new highways, new lanes added to existing highways (so long as the number of existing toll-free lanes is not reduced), reconstruction of highways (non-Interstate only), reconstruction or replacement of bridges or tunnels, and capital improvements to existing toll facilities" (FHWA, 2013b). There are also tolling requirements for federal tolling programs, including restrictions on the use of toll revenues.

The tolling requirements entail that all toll revenues are first used for any of the following: debt service; reasonable return on private investment; O&M, including reconstructing, resurfacing, restoring, and rehabilitating work; and payments between public and private partners involved in a public-private partnership. If the public authority of the toll facility confirms that the facility is

being adequately maintained, then toll revenues could be used for other purposes eligible under Title 23. Decisions regarding the amount of tolls charged are made by the toll authority under state law. Toll facilities are required to undergo annual audits to verify adequate maintenance and compliance with the limitations on the use of toll revenues. The results of these audits must be transmitted to the FHWA (FHWA, 2013b).

2.7 DESIGN, CONSTRUCTION, AND OPERATION IN THE DALLAS FLOODWAY

This section examines regulatory and practical requirements affecting any Build Alternatives that would be located within the Dallas Floodway. Such considerations are part of the overall evaluation of potential alternatives to both meet the need and purpose of the Trinity Parkway without incurring unnecessary expense or adverse environmental or socioeconomic impacts..

2.7.1 Trinity Parkway Construction in the Dallas Floodway

In addition to the authority regarding use or impairment of federal projects under Section 408, the USACE has the authority, under 33 U.S.C. Section 709, to prescribe regulations addressing the use of storage allocated for flood control projects. The USACE Fort Worth District, in accordance with the regulations in 33 CFR Part 208, retains the right to review and approve all proposed improvements and/or modifications that are passed over, under, or through the walls, levees, improved channels, interior drainage areas, or floodways of an existing federal flood protection project constructed by the USACE, and for which local project sponsors and/or local governmental agencies have the responsibilities for O&M (33 CFR Section 208.10). The Dallas Floodway is a federal flood protection project, and is therefore subject to these provisions. USACE Pamphlet No. 1150-2-1, *Criteria for Construction within the Limits of Existing Federal Flood Protection Projects* (USACE, 2003b), is the most current document providing guidance to individuals, developers, architect-engineering firms, local project sponsors, and local governmental agencies for the construction of new facilities or the modification of existing facilities within the limits of such projects. This pamphlet is included in full in **FEIS Appendix E**. Additional USACE regulatory responsibilities under Section 408 for proposed modifications to federal flood control projects are discussed in **FEIS Section 1.6.5**.

Trinity Parkway Build Alternatives 3C and 4B would be located adjacent to existing Dallas Floodway levees, and would require special treatment of embankments to maintain the integrity of the levee systems. All of the construction immediately adjacent to the levee could have an effect on the stability and function of the levees, both during construction and long term. For this reason, Alternatives 3C and 4B have been designed to address the USACE guidance noted

above (see **Appendix E**) as well as project-specific guidance received from the USACE Fort Worth District throughout the development of the proposed project. The subsections that follow discuss the effect of the Trinity Parkway on the proposed levee remediation plan, earthworks balance, and compatibility with floodway system operations and maintenance.

2.7.1.1 Levee Remediation Plan and the Trinity Parkway

As previously discussed in **FEIS Section 1.6.4**, the *USACE Periodic Inspection Report No. 9* identified deficiencies to the east (adjacent to Alternative 3C and 4B) and west (adjacent to Alternative 4B) Dallas Floodway levees (USACE, 2009b). In response to the USACE Report, the City of Dallas started an extensive geotechnical and engineering analysis of the levee systems in 2009. The study team revisited all of the USACE-reported deficiency sites, and developed response plans for immediate needs. Many of the items in the original deficiency list were characterized as routine O&M issues, and the City of Dallas Flood Control District mobilized to repair and restore these in consultation with the USACE. The District prepared a MDCP plan covering these items, and the USACE approved the MDCP plan on June 30, 2009. The O&M items and MDCP plan are discussed in the 2012 Trinity Parkway LSS (see **LSS Section 3.2** for additional details). Other items in the deficiency list, such as improving the levee crest height and addressing seepage, were more complicated problems and have required extensive geotechnical testing and engineering analysis to develop solutions. These issues are discussed further below.

Seepage Control

The City of Dallas began work on a near-term LRP to address under-seepage problems and restore the 100-year level of protection for the levee system to achieve FEMA 100-year accreditation. In summary, these near-term improvements included construction of approximately 18,300 linear feet of riverside cutoff walls along selected portions of the east and west levees of the Dallas Floodway and concrete riprap scour protection at the Hampton Pump Station outfall channels (City of Dallas, 2012k). Construction began in June 2010. The cutoff walls are composed of native soils mixed with Bentonite clay and constructed using slurry trench methods. Bentonite is a highly impermeable clay, and is intended to provide a barrier to migration of water under the levee. The wall is intended to intercept and cut off any sand seams or permeable strata under the levee, thereby preventing seepage, which might otherwise threaten levee performance during floods. These newly constructed city cut-off walls are on the riverside of the levee(s) (beginning between Sylvan Avenue/Hampton Road and heading north), located approximately 50 to 100 feet from the levee toe. Should a Trinity Parkway Dallas Floodway Alternative (Alternative 3C or 4B) be selected in the anticipated ROD, the cut-off walls would not be an impediment to construction of the roadway embankments or any potential levee expansion

(see discussion of USACE Dallas Floodway Project below). Therefore, Alternatives 3C and 4B would be compatible with the LRP cut-off walls.

Additionally, should a Dallas Floodway Alternative be selected, in-depth analyses would be required during final design to ensure that any negative impacts are addressed appropriately. For instance, areas of sandy material in the Dallas Floodway floor may be exposed by the borrow operation for the Trinity Parkway embankments (see **FEIS Section 2.7.1.2**). Where such conditions exist, appropriate methods of cutting off under-seepage would be required to protect the integrity of the levee. Depending on the nature of the encountered conditions, appropriate methods may include cutoff walls (as discussed above) and impervious membranes or liners in the potential borrow areas. As a conservative estimate, cost estimates (2011 dollars) developed for Alternatives 3C and 4B include costs to construct cut-off walls along the entire length of the alignment within the floodway.

The city's plan to control seepage through the Dallas Floodway levees also includes a proposal to address seepage around foundations, which penetrate the levees. Filter collars were approved by the USACE and constructed at the Margaret Hunt Hill Bridge levee crossing, and are planned to be implemented as part of the Sylvan Avenue Bridge Project (currently under construction). For these projects, bridge columns located immediately landside of the levees include sand and concrete filter collars as redundant treatments to mitigate potential under-seepage along the interface between the concrete drilled shaft and adjacent clay soils. These levee crossings have also been reinforced with landside berms and French drains at the landside toe. The proposed Trinity Parkway Dallas Floodway alternatives may affect filter collars at existing bridges because the proposed tollroad embankments would raise the ground elevations around individual piers. This can be resolved through appropriate design measures; the city-proposed collars could be left in place, they could be demolished and rebuilt closer to the new ground surface, or they could be extended with additional collar material up to the new ground surface. Such measures would be made at the time of final design development, in the event that a Trinity Parkway Dallas Floodway Build Alternative is selected in the anticipated ROD, and would be subject to design review, permitting, and construction oversight by the USACE. Therefore, the proposed Trinity Parkway would be compatible with filter collars.

Due to the number of pier penetrations in close proximity and parallel to the land side toe of the levee(s), Alternatives 3C and 4B would include a diaphragm wall as a seepage control measure at the proposed Continental Avenue and Margaret Hunt Hill Bridge connections. For Alternative 3C, a diaphragm wall would only be required along the east levee; for Alternative 4B, a diaphragm wall would be required along the east and west levees. Diaphragm walls are

considered a worst-case solution to the pier penetration issue. The walls would be expected to cut off seepage down to bedrock in the affected areas and would be designed to withstand floodwater loads in the unlikely event large parts of the levee were washed away. These walls are more expensive than the filter collar method discussed above and cost on the order of $1 million for each 100 feet length of wall.

Levee Remediation Plan

The longer-term portion of the LRP is to address SPF major deficiencies with the ongoing Dallas Floodway Project by the USACE and City of Dallas. As previously described in **FEIS Section 1.6.1.2**, the WRDA of 2007 authorized the USACE to participate in investigations and analyses regarding remediation of the Dallas Floodway System. Such investigations by the USACE have led to the development of a Flood Risk Management Plan for the Dallas Floodway System. Based on the best available information at the time of preparation of this FEIS, the Flood Risk Management Plan (as part of the Dallas Floodway Project) includes two primary actions. First, the plan includes raising low points at various locations along the east and west levees of the Dallas Floodway System to contain the SPF, which is estimated to produce flow of 277,000 cubic feet per second with an annual probability of occurrence of 0.04 percent (i.e., about a 1/2,500 chance per year event). Second, the plan includes modification to the AT&SF Bridge (i.e., removal of bridge sections not integrated into the Santa Fe Trestle Trail design) to prevent the build-up of storm debris in its piers which cause floodwaters to back up into the system. Additionally, cut-off walls could be considered as part of the Dallas Floodway Project for their benefits to the BVP for river relocation features. It should be noted that plans for the Dallas Floodway Project are still under development and subject to change. Trinity Parkway Build Alternatives 3C and 4B are proposed to be constructed on embankments alongside the Dallas Floodway levees, with the embankments offset sufficiently from the existing levee face to allow for future raising of the levees by the City of Dallas/USACE. The Trinity Parkway schematic designs to date have assumed raising the levee to a height equivalent to SPF flood elevation plus 2 feet. The crown of the improved levee to date has been assumed to be 16-feet wide, and the riverside slopes have been assumed to be 4:1 (horizontal:vertical).

The City of Dallas and USACE work for the LRP and the USACE Dallas Floodway Project EIS include a fresh look at the design of future levee improvements, using the extensive soil borings and geotechnical analysis done in 2009 - 2011. This new evaluation opened the possibility that the future levee height and slopes assumed for the Trinity Parkway Dallas Floodway Alternatives might change, possibly affecting the position of the roadway relative to the existing levees. On September 30, 2011, the Fort Worth District of the USACE issued a letter to the FHWA – Texas Division to provide an update on the levee remediation analyses done to date and to facilitate

completion of this LSS. The letter (see **FEIS Appendix A-2**, Pages 62-63) made the following statement:

> *"Based on the analysis done to date, no riverside slope stability problems have been identified for the existing Dallas Floodway levees. Given that the current riverside slopes are no flatter than 4:1 (horizontal:vertical), the levee improvement template currently being utilized in the Trinity Parkway alternative evaluation process, which assumes a future 2-foot levee raise with 4:1 riverside slopes, appears to be a reasonable assumption for use in the Limited Scope Supplement document, based on the best available information."*

Based on the USACE letter, the proposed Trinity Parkway remains compatible with the anticipated future levee geometry. In the event that one of the Trinity Parkway alternatives in the floodway is selected in the anticipated ROD, additional coordination with the USACE and the City of Dallas would be required to ensure that the roadway design remains compatible with final remediation plans for the levees.

2.7.1.2 Earthworks Balance

Based on available geotechnical information from the USACE and NTTA, it is understood that the existing Dallas Floodway levees are comprised largely of impervious clay materials. As previously discussed in **FEIS Section 2.7.1.1**, within the scope of the Dallas Floodway Project by the USACE and City of Dallas, consideration is being given to increasing the height of the Dallas Floodway levees. Inside the Dallas Floodway, Alternatives 3C and 4B are proposed to be constructed on embankments built using material borrowed from the floodway. As discussed in the SDEIS and LSS, contractor furnished fill could be used for any embankment needs for Alternatives 3C and 4B segments located outside the Dallas Floodway. Coordination with the USACE and the City of Dallas on construction phasing and usage of borrow material from the floodway would continue in the event that a Dallas Floodway Build Alternative is selected in the anticipated ROD. It is anticipated that usage of borrow material would depend on the timing of projects in the floodway and that agreements regarding borrow material would be made at a later date.

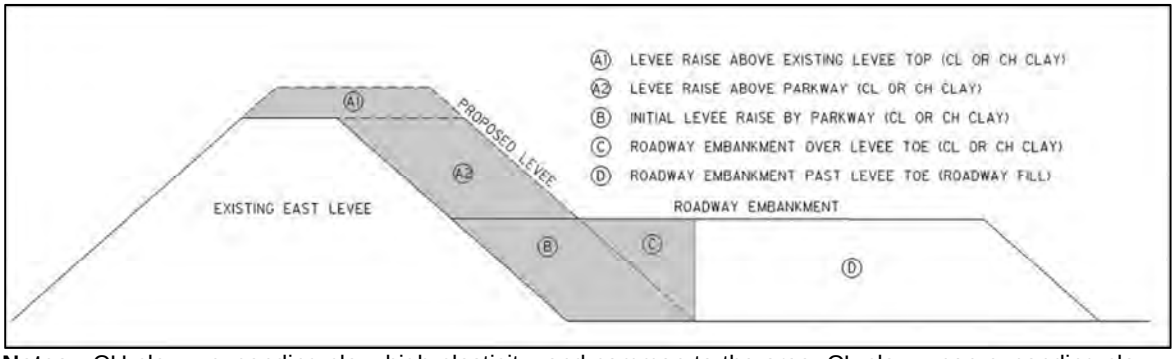
Since the completion of the SDEIS and in response to the USACE inquiries, further studies have been conducted to characterize the geotechnical suitability of soil materials from five proposed borrow areas identified for the Dallas Floodway Alternatives. The soil data and analyses are documented in a 2009 Terracon geotechnical engineering report "Borrow Soil Suitability and

Shrinkage Factor." The purpose of this analysis was to provide a characterization of soil materials in the borrow sites and to demonstrate an initial earthworks balance between the Trinity Parkway, the anticipated Dallas Floodway levee improvements adjacent to Trinity Parkway, and the proposed borrow excavations. The five proposed borrow areas, which correlate with the proposed location of BVP features (City of Dallas, 2003a) that will be evaluated for environmental acceptability and technical soundness by the USACE prior to implementation (as part of their feasibility report discussed in **FEIS Section 1.6.1.2**), were identified as:

1. Hampton Swales
2. West Dallas Lake
3. Urban Lake
4. Natural Lake
5. Corinth Swale (Oxbow Lake)

Figure 2-22 shows the basic cross section (only east levee is shown) and soil type needs for the embankments of the Dallas Floodway Alternatives, including the potential adjacent levee improvements planned as part of the City of Dallas/USACE Dallas Floodway Project that would need to be coordinated with construction of either Alternative 3C or 4B. As noted in **FEIS Section 2.7.1.1**, future levee height raises and slope (symbolized by A1 and A2 in **Figure 2-22**) would be based on the levee remediation plans finalized as part of the Dallas Floodway Project. Levee fill sections A1, A2, B, and C (shaded) require low permeability fill to maintain a water-tight levee. The roadway embankment (section D) can incorporate higher permeability fill. Soil in the identified borrow areas was therefore classified into two applicable categories: (i) levee useable (i.e., suitable for levee construction and, although less desirable than some other soil types, could also be used for roadway embankment); and (ii) roadway embankment useable (i.e., only suitable for roadway embankment and could not be used to raise the levees).

FIGURE 2-22. TRINITY EARTHWORK SUMMARY



Notes: CH clay = expanding clay, high plasticity, and common to the area; CL clay = non-expanding clay, low plasticity, less common in the area. Potential levee raises (A1 and A2) are based on future levee remediation plans to be finalized as part of the City of Dallas/USACE Dallas Floodway Project.

A summary of the earthworks analysis included in **LSS Sections 4.1.6.4** and **4.1.7.4** is provided in **Table 2-7** for Build Alternatives 3C and 4B, respectively. According to the data for Alternative 3C, the required volume of levee-usable soil was determined to be 1.32 million cubic yards (CY) (Shapes A2, B, and C as shown in **Figure 2-22** from Hampton to the DART Bridge). The roadway embankment-usable soil needs were determined to be 3.06 million CY (Shape D). The levee raise above the existing levee top (Shape A1) within the proposed construction limits for Alternative 3C may be done by the City of Dallas after the Trinity Parkway is built (as part of the Dallas Floodway Project). The analysis of the five borrow sites shows that there is enough levee-usable material to fill the Alternative 3C need shown above, plus a 3.15 million CY surplus. While a shortfall of 1.76 million CY of roadway embankment-usable soil was identified, the surplus levee-usable soil can be utilized in the embankment for Alternative 3C although some soil conditioning (e.g., lime stabilization) may be necessary (Section D in **Figure 2-22**).

TABLE 2-7. COMPARISON OF SOIL NEEDS AND BORROW VOLUMES

Dallas Floodway Alternative	Soil Suitability Type	Volume Needs[1] (CY)	Usable Excavation Volumes (CY)	Remainder (CY)
Alternative 3C	Levee	1.32 Million	4.47 Million	+ 3.15 Million
	Roadway Embankment	3.06 Million	1.30 Million	- 1.76 Million
	Total	**4.38 Million**	**5.77 Million**	**+1.39 Million (surplus)**
Alternative 4B	Levee	2.6 Million	4.5 Million	+ 1.9 Million
	Roadway Embankment	4.1 Million	1.3 Million	- 2.8 Million
	Total	**6.7 Million**	**5.8 Million**	**-0.9 Million (shortfall)**

Notes:
1. Includes 10% shrinkage for roadway (shapes C & D in **Figure 2-22**) and 25% shrinkage for levee raise (shapes A2 and B)

The required volume of levee-usable soil for Alternative 4B was determined to be 2.6 million CY (Shapes A2, B, and C as shown in **Figure 2-22** from Hampton to the DART Bridge). The roadway embankment-usable soil needs were determined to be 4.1 million CY (Shape D). The levee raise above the existing levee top (Shape A1) within the proposed construction limits for Alternative 4B may be done by the City of Dallas after the Trinity Parkway is built (as part of the USACE Dallas Floodway Improvement Project). The excavation shapes as proposed for Alternative 4B would be somewhat short (-0.9 million shortfall) of achieving an earthworks balance with the east and west roadway embankments of Alternative 4B. The needed material is expected to be available by reshaping or deepening the proposed borrow sites.

As indicated above, geotechnical sampling within the Dallas Floodway demonstrates that current design for excavation areas would result in sufficient borrow material that would be suitable for constructing Alternative 3C. Previous sampling has shown that a small portion of material within designated excavation areas would be unsuitable for either levee or road fill, such as construction debris, metal-containing fill, or miscellaneous trash. If areas of unsuitable material are detected from pre-construction geotechnical testing, such areas may be avoided or relocated within the Dallas Floodway, as appropriate. If unsuitable material is encountered during or after excavation, such material may be relocated to an over-excavated hole in the same excavation area, or removed to one of the other excavation areas where it may be used to backfill the excavation of usable material. In all circumstances where unsuitable material is encountered, it would remain within the Dallas Floodway and placed in over-excavated areas to reduce surface area impacts and to avoid impacts to the hydraulic characteristics of flood protection features.

2.7.1.3 Compatibility with Floodway System Operations and Maintenance

Regarding operations and maintenance, flood fighting, and surveillance, NTTA has consulted with the City of Dallas Trinity Watershed Management (formerly Street Services Department), Flood Control Division (Dallas Floodway Manager) in developing an agreed overall concept for the Trinity Parkway operations and maintenance within the Dallas Floodway. In the Dallas Floodway, the Flood Control Division uses various access points from bridge crossings and other local streets to access the levee top gravel roads for O&M, flood fighting, and surveillance. Access to the levee tops is currently somewhat restricted because of the 13 existing bridges, which cross the levee tops, mostly at grade. These bridges break up the levee top roads into segments, most of which are connected by gravel roads down the landside faces of the levees. A segment of the east levee between Continental and UP Railroad is believed to be inaccessible during high floods because the connecting roads are located only on the riverside of the levee.

In the design of the Dallas Floodway Alternatives (Alternatives 3C and 4B), NTTA would provide undiminished access through O&M roads to all levee segments and floodway areas currently maintained by the Dallas Flood Control Division. The same considerations for undiminished Dallas Flood Control Division access would also apply to the construction phase of either Alternative 3C or 4B. The roadway construction documents would acknowledge the primacy of the flood control function, and provide the City of Dallas Flood Control Division unhindered access at all times to the NTTA construction areas for operations and maintenance of the flood control function. Such unhindered access would include the right to shut down construction, in part or whole, for such period of time that the Division reasonably declares necessary to perform required operations, maintenance and repairs, and flood fighting activities. The sequence of the

construction would also need to demonstrate no short-term or long-term negative impacts to the Flood Control Division activities, including provision of temporary roadways and similar features as needed, to provide continuity of Flood Control Division access through the construction areas.

O&M roads discussed above would provide access for mowing and maintenance of the Dallas Floodway floor. Additional floodway floor access is provided by existing gravel access roads over the levees connecting to longitudinal maintenance roads along the riverside toes of the levees. NTTA plans for the Dallas Floodway Alternatives 3C and 4B to include programmed ramps into the Dallas Floodway floor from several cross-street bridges (see **FEIS Section 2.7.3**). These ramps could be used to provide access to the Dallas Floodway floor for the Flood Control Division in areas that would otherwise be cut off by the Trinity Parkway. Additionally, NTTA would replace and reconnect the longitudinal maintenance roads in segments affected by the Trinity Parkway embankments.

2.7.2 Pump Stations in the Dallas Floodway

Alternatives 3C and 4B are proposed to be located within the Dallas Floodway on a raised embankment, riverside of the existing levees. As described in **FEIS Sections 2.3.2.4** and **2.3.2.5**, these roads would be depressed under existing bridges. In several of the depressed segments, the road surface must be lowered below the Trinity River 100-year flood level. To prevent inundation of the road, flood separation walls and pump stations are proposed to be added to maintain 100-year flood protection.

The locations of the proposed flood separation walls are shown in **FEIS Plates 2-4 (A-B)** and **2-5 (A-B)**. The flood separation walls appear as brown shading on the profiles of Alternatives 3C and 4B. The flood separation walls would be set with their top elevations 2 feet above the computed 100-year water surface, providing a level of flood protection commensurate with NTTA and TxDOT standards for highway/tollway mainlanes. In the event of overtopping by a flood in excess of a 100-year event, the walls would be designed to allow a managed inflow of water, suitably protected from erosion and other hazards of the inflow. Appropriate design measures to mitigate the effects of overtopping of the wall sections would be coordinated with USACE Fort Worth District and designed using USACE design standards in order to minimize impacts on the flood control project.

The design of the flood separation walls would be guided by USACE publications EM 1110-2-2502, “Engineering and Design - *Retaining and Flood Walls*,” (1989) and EM 1110-2-2102, “Engineering and Design - *Waterstops and Other Preformed Joint Materials for Civil Works*

Structures" (1995a). See also **FEIS Section 2.7.4** regarding the emergency response plan in the event of overtopping of flood separation walls within the Dallas Floodway.

In the general area of the sag points of the depressed segments, pump stations would be provided to drain out the sags. These pump stations would be sized to discharge stormwater under all normal operating conditions on the roadway. Additionally, the pumps would be submersible and their motor control centers suitably protected so that the pumps would remain operable, even in the event the 100-year flood was exceeded and the depressed segments flooded. After such an event, once the river has suitably receded, the pumps could be restarted to completely drain the depressed segments. **FEIS Plate 2-7** at the end of this chapter provides a conceptual layout of a pump station. It is expected that pump stations would be installed in recesses along the shoulder of the roadway, so maintenance vehicles could park over the tops of pump stations without interfering with traffic on the mainlanes.

2.7.3 Facility Operations and Maintenance in the Dallas Floodway

Alternatives 3C and 4B each would have approximately 6.2 miles or approximately 70 percent of their total lengths located within the Dallas Floodway or on land owned by the City of Dallas. On a typical tollroad, NTTA acquires or otherwise takes control of the ROW needed for the facility, and thereafter takes sole responsibility for operations and maintenance. Within the Dallas Floodway, NTTA would not acquire ownership but would require access rights. Additionally, there would need to be a division of responsibilities for operations and maintenance between the NTTA and the City of Dallas, meeting the needs of the roadway and the ongoing need for flood protection.

In the event of the FHWA's selection of one of the Trinity Parkway alternatives within the Dallas Floodway in the anticipated ROD, a Memorandum of Understanding (MOU) between NTTA and the City of Dallas is proposed to be drafted to establish the rights and responsibilities of NTTA in its use of City of Dallas Floodway land. It is proposed that the NTTA would be given day-to-day responsibility for a strip of land along the roadway corridor, encompassing the pavement, the shoulders, traffic barriers, drainage facilities, and other facilities needed to support the operation of the road. In general, this would cover the area from approximately 30 feet off the edge of the outer lanes on the levee side of Alternatives 3C or 4B, to the traffic barriers on the river side of Alternatives 3C or 4B. Conceptually, NTTA would take day-to-day responsibility for operations and maintenance within this area, and the City of Dallas would take responsibility outside of this area. Notwithstanding this arrangement, the MOU would acknowledge the primacy of the flood control function, and, therefore, it would provide the City of Dallas Flood Control Division

unhindered access at all times to the NTTA-maintained land for operations and maintenance of the flood control function. Further, the MOU would include a provision that the Flood Control Division has the right to shut the road down, in part or whole, for such period of time that the Flood Control Division reasonably declares necessary, to allow unhindered access for performing required operations, maintenance and repairs, as well as flood fighting activities.

The City of Dallas currently mows the Dallas Floodway several times per year to maintain flood conveyance. The MOU would establish NTTA responsibility for at least equal mowing along the roadway corridor.

As discussed in **FEIS Sections 1.6.1.2 and 2.7.1**, it is assumed that proposed City of Dallas BVP lakes within the Dallas Floodway could be used as borrow sites to produce needed material to build roadway embankments for the various Trinity Parkway Build Alternatives. The volume of excavation would vary between alternatives, with the Irving/Riverfront Boulevard Alternatives (2A and 2B) requiring relatively little borrow compared to the Dallas Floodway Alternatives (3C and 4B). To the extent that proposed BVP sites are used to produce borrow material for the Trinity Parkway, these are assumed to be left as "dry" excavations at the conclusion of the Trinity Parkway construction. The excavated features would be graded to drain towards the Trinity River pilot channel. Thus, the features would appear as benches in the riverbanks. River floods would inundate the excavated areas from time to time, but the water would rise and recede and the areas would dry out. The excavated features included in the Trinity Parkway would include suitable grading, revegetation with grass, and other features designed to allow them to function indefinitely as conveyance basins. Indeed, such features would be vital to the functioning of the Dallas Floodway as a hydraulic offset to the toll road embankment and other facilities, and would continue to serve that long-term purpose even if the independent BVP project is postponed or cancelled by the City of Dallas.

In the time period between the end of Trinity Parkway construction and start-up of BVP lake construction, there would be a maintenance responsibility for the excavated areas in the Dallas Floodway. Since these areas are already under city maintenance responsibility, the city would continue to maintain and mow the excavated features upon completion of Trinity Parkway construction. In the event that intermittent flooding causes substantial sedimentation of these features, it is anticipated that the Flood Control Division would remove such sediment and reestablish grass cover as necessary.

2.7.4 Emergency Action Plan in the Dallas Floodway

As previously stated, Alternatives 3C and 4B would each have approximately 6.2 miles or approximately 70 percent of their total lengths located on a raised embankment riverside of the levees within the Dallas Floodway. Within the Dallas Floodway, the road surface would typically be set above the 100-year water surface elevation. As described in **FEIS Section 2.7.2**, in segments where the road would be depressed below the 100-year level, flood separation walls and pump stations would be added to maintain 100-year flood protection. The 100-year flood protection standard is commensurate with the designs of other roadways on the NTTA system and meets or exceeds the FHWA design standards. However, due to the flood risk within the Dallas Floodway, a specific Emergency Action Plan for the period during construction as well as during normal operations of the constructed parkway would be needed for the Trinity Parkway, if Alternative 3C or 4B is selected by the FHWA in the anticipated ROD. This Emergency Action Plan must be reviewed and approved by the City of Dallas, NTTA, TxDOT, the FHWA, and USACE prior to final approval of construction by the USACE.

The Emergency Action Plan would establish procedures to evaluate and react to hazardous flooding events, both as the event is being forecast and as the event occurs. The Plan would be implemented based on river flood stage data. The NTTA Director of Maintenance would be responsible for management and implementation of the Plan with respect to the roadway. However, the Division Manager of the City of Dallas Trinity Watershed Management, Flood Control Division would be consulted before and during any implementation, and would be given primary authority with respect to actions during flood events. Further, as stated in **FEIS Section 2.7.3**, the MOU would include a provision that the Flood Control Division has the right to shut the road down, in part or whole, for such period of time that the Flood Control Division reasonably declares necessary to allow unhindered access for flood fighting activities.

The Trinity Parkway Emergency Action Plan would identify a sequence of actions to be taken prior to, during, and after a major flood event. The role of the NTTA would be defined, along with the roles of federal, state, and local agencies. It would be anticipated that NTTA staff and on-site Texas Department of Public Safety staff would take roles in implementing the Plan. Public safety and protection of property would be the primary goal of the Emergency Action Plan, and accordingly, the Plan would include steps for closure and evacuation of the roadway in the event of expected inundation. The Plan would include a detailed schedule for implementation, annual reviews, and updates, and would include maintenance and repair actions in the event of overtopping of the depressed segments of the roadway or other damage to the roads. **FEIS Appendix H-3** provides a draft Emergency Action Plan outlining alarms, notification, and roadway

closure procedures in the unlikely event that a flood in excess of the 100-year event in the Dallas Floodway occurs. The Emergency Action Plan would be developed further during final design if Alternative 3C or 4B is selected in the anticipated ROD.

2.8 EVALUATION OF THE BUILD ALTERNATIVES

2.8.1 Introduction

This section sets out the evaluation of the Build Alternatives leading to the FHWA's recommendation of a Build Alternative for further design development and impacts/mitigation analysis. This evaluation of the four Build Alternatives is based on information developed to a comparable level of detail as of the publication of the SDEIS in February 2009, as supplemented by the LSS in March 2012. In addition, the FHWA considered feedback from government agencies and members of the public in connection with the public hearings on the SDEIS and LSS held in 2009 and 2012, respectively (see **FEIS Appendices L** and **M**). Although this evaluation concentrates on the information developed during the past 5 years, the discussion below draws upon the collective information and agency/public feedback acquired throughout the entire NEPA process dating back to the MTIS in 1997. Given the vast amount and diverse types of information included in FHWA's evaluation of alternatives, the purpose of the following discussion is to summarize key elements of anticipated environmental and socioeconomic impacts, and then analyze those impacts according to the process and decision criteria required by federal policy and regulations relating to projects affecting wetlands and/or floodplains.

The approach to evaluating the Build Alternatives has been molded entirely by Executive policies and the FHWA's regulations that prescribe an analytical model for federal projects with potentially significant impacts to wetlands and encroachment into floodplains. This analytical model has similarities to traditional alternatives analysis that would apply in the absence of significant wetland/floodplain impacts, but is different in its approach. The traditional NEPA analysis collects information about the design and expected impacts of various alternatives and then compares and contrasts the pros and cons of each alternative with the others in an effort to select the best overall alternative. However, federal policies do not allow this approach to alternatives analysis in situations involving potentially significant impacts to wetlands or floodplains. Instead, the policies designed to protect wetlands and floodplains require federal agencies to first determine that there are no "practicable" alternatives that would avoid impacts to wetlands/floodplains before considering practicable alternatives with potentially significant impacts to wetlands/floodplains. Moreover, if there is more than one practicable alternative with impacts to wetlands/floodplains is available, then the agency must recommend the practicable alternative with the least degree of

impacts to wetlands and the least amount of encroachment into floodplains. The particular definition of "practicable" and agency policies regarding its analysis is discussed below in some detail, but this introduction to "practicability" is important at this point to explain why the particular approach to alternatives analysis was taken in this FEIS.

The evaluation of expected environmental impacts in the Trinity Parkway SDEIS indicated that all four Build Alternatives are expected to have effects on waters of the U.S., including wetlands, and therefore, would require a permit under Section 404 of the CWA and require compliance with EO 11990 (Protection of Wetlands) (42 *Federal Register* 26961, May 24, 1977). In addition, EO 11988 (Floodplain Management) (42 *Federal Register* 26951, May 24, 1977) also applies because Alternatives 3C and 4B are located primarily within the Dallas Floodway, resulting in significant and longitudinal floodplain encroachments, as are smaller portions of Alternatives 2A and 2B. Regulations implementing these EOs require federal agencies, prior to selecting an alternative with impacts to wetlands or significant encroachment into floodplains, to first demonstrate that there is no "practicable alternative" to placing any portion of the project within wetlands or floodplains. The above-mentioned EOs and implementing federal regulations further require that if there are multiple practicable build alternatives would result in impacts to wetlands or floodplains, then federal agencies must select the alternative that would result in the least amount of harm to wetlands and floodplains. Throughout the remainder of this FEIS, the above-described practicability analysis pursuant to EO 11990 (Protection of Wetlands) and EO 11988 (Floodplain Management) is referred to as the 'EO practicability analysis.' This has been done in this FEIS to distinguish it from the '404 practicability analysis' described below.

The 404 practicability analysis is separate and distinct from the EO practicability analysis as it relates only to Section 404(b)(1) of the CWA. Section 404 of the CWA authorizes the USACE to issue permits for the discharge of dredged or fill material (i.e., suitable from a geotechnical and environmental standpoint) into waters of the U.S., including wetlands. The USACE and USEPA rules implementing Section 404 address standards for protection of wetlands and permit criteria, including the selection of sites for the deposition of fill material. Most pertinent here are the Section 404(b)(1) regulations promulgated by USEPA that all permit applicants must satisfy (40 CFR Part 230, *Guidelines for Specification of Disposal Sites for Dredged or Fill Material*; hereinafter "Section 404(b)(1) Guidelines"). Under these regulations, the applicant must demonstrate that there is no "practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem" (40 CFR Section 230.10(a)). These regulations further provide: "The term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 CFR Section 230.3(q)).

There are two important distinctions relating to discussions of EO practicability and 404 practicability in this FEIS. First, the decision-making agency is different for each analysis; the FHWA determines EO practicability in accordance with its policies and guidance, and the USACE makes the determination of 404 practicability according to its policies and guidance. Second, the scopes and analytical models for the two practicability evaluations are distinctly different. In making its determination of 404 practicability, the USACE analysis is limited to the three factors of cost, technology, and logistics. Also, the USACE does not evaluate these three factors collectively in assessing practicability, but separately examines each alternative in light of each factor to determine whether an alternative is practicable as to that factor. In contrast, the FHWA assesses EO practicability for an alternative by considering cost, technology, and logistics, in addition to myriad other factors including natural or physical environment constraints (e.g., habitat values, conservation, water features) and socioeconomic constraints (i.e., quality of life factors such as the needs and welfare of the community, air quality, aesthetics). Additionally, the FHWA makes its determination of EO practicability for each alternative based on an individual and comprehensive/collective analysis of information relating to all evaluation factors.

The respective roles of the FHWA and the USACE in determining EO practicability and 404 practicability, have influenced the placement of the discussions of each analysis in this FEIS. As 404 practicability is relevant to whether the alternatives would be capable of receiving a Section 404 permit from the USACE, the FHWA-recommended 404 practicability discussion and supporting materials are included in **FEIS Appendix G-1**. These materials were prepared in cooperation with the USACE as a stand-alone collection of information to assist the USACE in carrying out its regulatory role under Section 404; it is expected that the USACE would utilize and adapt the materials in **FEIS Appendix G-1** in preparing its Section 404 regulatory analysis and decision documents. As the EO and 404 practicability analyses share the consideration of cost, existing technology, and logistics as evaluation criteria, the same methodology has been applied to each of these factors and the conclusions regarding these factors is the same for both analyses.

The EO practicability analysis is presented in this section and is organized as follows: **FEIS Section 2.8.2** provides a summary of the EO policies and regulatory standards; **FEIS Section 2.8.3** describes the methodology used to evaluate EO practicability; **FEIS Section 2.8.4** provides a summary of pertinent data regarding each alternative, organized by EO practicability factor; this is followed in **FEIS Section 2.8.5** by a discussion of each alternative as to whether it is “practicable” as to each EO factor individually and collectively; **FEIS Section 2.8.6** evaluates and determines the alternative that minimizes impacts to wetlands and floodplains under EO

practicability criteria; and **FEIS Section 2.8.7** states the conclusions of the EO practicability analysis and recommends an alternative for further design development.

2.8.2 Regulatory Context for EO Practicability Analysis

2.8.2.1 Executive Order 11990 – Protection of Wetlands

EO 11990 (Protection of Wetlands) establishes a national policy "to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative." Each federal agency must minimize the destruction, loss, or degradation of wetlands, and preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. The EO requires each federal agency, to the extent permitted by law, to avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds, "(1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use." The EO does not define "practicable," but provides the following explanation as to the relevant criteria for making an EO practicability determination: "In making this finding the head of the agency may take into account economic, environmental and other pertinent factors."

Section 6 of the EO requires agencies to "issue or amend their procedures" to comply with the Order. Accordingly, the USDOT Order 5660.1A issued its implementing policies, *Preservation of the Nation's Wetlands* on August 24, 1978. The USDOT requirements are intended "to assure the protection, preservation, and enhancement of the nation's wetlands to the fullest extent practicable during the planning, construction, and operation of transportation facilities and projects." The USDOT policy states "economic, environmental and other factors may be taken into account" in making a finding of no practicable alternative. The USDOT policy requires that agencies with jurisdiction, the USACE in the case of Trinity Parkway, should be consulted for advice and assistance concerning any proposed wetland impacts.

In 1987, the FHWA addressed compliance with EO 11990 (Protection of Wetlands) in the FHWA Technical Advisory T6640.8A *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (October 30, 1987). This FHWA guidance states that if "the preferred alternative is located in wetlands" then the "final EIS needs to contain the finding required by [EO] 11990 that there are no practicable alternatives to construction in wetlands."

In 2000, the FHWA issued a final rule that reiterates and further implements the EO and USDOT Order 5660.1A (23 CFR Part 777 *Mitigation of Impacts to Wetlands and Natural Habitat*). This rule contains the following definition (23 CFR Section 777.2), "Practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics, in light of overall project purposes." The EO and FHWA regulations further require that, if there is no practicable alternative to new construction in wetlands, then project planners must include all "practicable measures to minimize harm to wetlands" (23 CFR Section 777.3(a)(2)).

2.8.2.2 Executive Order 11988 – Floodplain Management

EO 11988 (Floodplain Management) establishes a national policy "… to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." The EO states "if an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse impacts and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires siting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain, . . ."

In 1979, the FHWA promulgated regulations in 23 CFR Part 650 – *Bridges, Structures, and Hydraulics*, Subpart A—*Location and Hydraulic Design of Encroachments on Flood Plains.* These regulations require that if a Build Alternative is recommended that "includes a significant encroachment" into a floodplain, an "Only Practicable Alternative Finding" would be required in the FEIS. Specifically, the FHWA regulation includes the policy to "avoid longitudinal encroachments" as well as "significant encroachments" where practicable (23 CFR Section 650.103(b) and (c)). These regulations contain the following definition, "*Practicable* shall mean capable of being done within reasonable natural, social, or economic constraints" (23 CFR Section 650.105(k)). The FHWA regulations cite five factors to be considered in location studies in floodplains, namely (i) risks associated with implementation of the action, (ii) impacts on natural and beneficial floodplain values, (iii) support of incompatible development, (iv) measures to minimize floodplain impacts, and (v) measures to restore and preserve the natural and beneficial floodplain values impacted by the action (23 CFR Section 650.111(c)(1-5)). Further, the FHWA regulations require a discussion of the practicability of alternatives to any significant and/or longitudinal encroachments to floodplains (meaning non-floodplain sites must be discussed), and a summary of the findings for both the floodplain and non-floodplain alternatives in the environmental documents.

The FHWA also discussed compliance with EO 11988 (Floodplain Management) in the FHWA Technical Advisory T6640.8A *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (October 30, 1987). This FHWA guidance states that the DEIS needs to include an evaluation and discussion of practicable alternatives to the floodplain encroachment. Similar to the FHWA's policy on complying with EO 11990 (Protection of Wetlands), this Technical Advisory states that if the preferred alternative includes a floodplain encroachment having significant impacts, then the FEIS must include a finding that there are no practicable alternatives as required by 23 CFR [Part] 650, Subpart A.

2.8.2.3 USACE Position Paper and Policy

The USACE-Fort Worth District has presented a position paper outlining certain NEPA requirements that apply to the Trinity Parkway. This document is included in **FEIS Appendix A-2**, Pages 19-24: "U.S. Army Corps of Engineers, Fort Worth District, Position Paper on Implementation of Executive Order 11988 Floodplain Management and Practicable Alternatives Analysis for the Trinity Parkway Project" dated December 18, 2009. This guidance document, which further discuss the points and authorities cited above, has helped inform the substance of the practicability analysis.

The USACE Engineering Regulation (ER) 1165-2-26 *Implementation of Executive Order 11988 on Flood Plain Management*, provides more information on EO 11988 (Floodplain Management) as it relates to USACE projects and provides helpful guidance for the overall EO practicability analysis. The regulation states, "practicable is capable of being done within existing constraints. The test of what is practicable depends upon the situation and includes consideration of the pertinent factors, such as environment, cost or technology." This ER also states, "The decision on whether a practicable alternative exists will be based on weighing the advantages and disadvantages of flood plain sites and non-flood plain sites." The USACE guidance specifies that all reasonable factors should be taken into consideration when determining practicability. These factors include: conservation, economics, aesthetics, natural and beneficial values served by floodplains, impact of floods on human safety, locational advantage, the functional need for locating in the floodplain, historic values, various wildlife and habitat impacts, and, in general, the needs and welfare of the community and the people associated with it.

2.8.3 Methodology for EO Practicability Analysis

Several aspects of EO 11990 (Protection of Wetlands) and EO 11988 (Floodplain Management) suggest they were intended for joint application (i.e., subject matter overlap, common terms, and the identical date of issuance). A 1978 CEQ Memorandum resolved this point by instructing federal agencies to jointly apply these Orders where wetland impacts occur within floodplains. The criteria for determining whether an alternative is practicable, based on the points and authorities discussed thus far, may be summed up in the "all reasonable factors" approach articulated in FHWA and USACE regulations (e.g., 23 CFR Section 650.105(k) and ER 1165-2-26). Although cost, technology, and logistics are central to the EO practicability analysis, it is clear that it is FHWA policy to consider a broader range of factors that address topics such as impacts to natural/physical environments and community socioeconomics. In essence, those considerations relevant for making a finding of EO practicability are essentially the same factors the FHWA uses determining whether to recommend an alternative for development to a higher level of detail. Moreover, this broader approach avoids the possibility of finding an alternative practicable solely in terms of cost, technology, and logistics, but could be extremely difficult to build because of significant impacts to natural resources or community interests.

The central theme of the EO practicability guidance is to first determine whether there are practicable alternatives to locating any portion of a proposed project in a wetland or floodplain. EO practicability is not a comparison of alternatives for the purpose of finding the most desirable alternative, but independently evaluates for each alternative this ultimate question: Can the alternative be built within existing constraints? Central to each of the guidance documents is that while they identify factors, they do not prioritize factors. Moreover, unlike the selection of a preferred alternative, which invites the comparison of relative differences between alternatives to make a selection, the determination as to whether a given alternative is practicable is the result of weighing of pertinent factors by the decision maker and reaching a finding that the alternative could be built if selected (i.e., is "capable of being done"). Thus, the focus of the analysis is whether each alternative would realistically be able to be constructed even if it were the only Build Alternative. This approach underscores the fundamental difference between the comparison of alternatives in **SDEIS Chapter 4** for the purpose of evaluating the most desirable alternative, and an analysis of EO practicability that necessarily focuses on factors that individually or collectively would realistically preclude an alternative from being constructed.

Based on the federal regulations and guidance discussed in **FEIS Section 2.8.2**., the 16 factors that have been considered in the EO practicability analysis are listed in **Table 2-8**. For each of the factors evaluated, consideration was given to the direct, indirect, and cumulative impacts for

each alternative as such information was presented in the SDEIS and LSS. It should be noted that the list of EO practicability factors differs slightly from that presented in the LSS. The three factors comprising the 404 practicability factors (i.e., cost, technology, and logistics) have been grouped together as 'EO/404 Practicability Shared Factors', for consistency with the 404 practicability analysis in **FEIS Appendix G-1**. In so doing, it was determined that economic costs should be grouped with 'Socioeconomic Factors' because federal regulatory policy regarding 404 practicability precludes the consideration of economic impacts as part of the project cost. In addition, it was determined that the "locational advantages" factor considered in the LSS actually addresses elements that are redundant with other factors that are part of both Natural Environment Factors and Socioeconomic Factors in **Table 2-8**, and was therefore absorbed into other factors considered and removed as a topic in the list of EO practicability factors.

TABLE 2-8. EO PRACTICABILITY FACTORS

EO/404 Practicability Shared Factors
1. Project cost (primarily construction cost, ROW cost, utilities relocation cost)
2. Existing technology
3. Logistics
Natural Environment Factors
4. Natural and beneficial values served by floodplains (including measures to restore and preserve any natural and beneficial floodplain values affected by the proposed project)
5. Waters of the U.S., including wetlands, and water quality
6. Fish and wildlife habitat values (including threatened and endangered species)
7. Conservation
Socioeconomic Factors
8. Needs and welfare of the community (social impacts, transportation, relocations and displacements)
9. Economic impacts (short and long term)
10. Air quality impacts
11. Traffic noise impacts
12. Impact of floods on human safety
13. Risks associated with implementation of the action
14. Incompatible development
15. Aesthetics
16. Historic values

The methodology outlined above has been applied to the four Build Alternatives under consideration, and adapted to minimize repetition in the presentation of information. Accordingly, the information presented in **FEIS Section 2.8.5** has been grouped by topic to avoid repetition of relevant facts relating to impact analyses or the environmental setting that are common to more than one of the alternatives. It is emphasized that the purpose of this approach is to improve readability but not for the purpose of comparing the grouped alternatives, as the determination of EO practicability is based on the evaluation of factors as applied individually to each alternative. The by-alternative assessment of EO practicability factors is provided in **FEIS Section 2.8.6**.

As appropriate, the presentation of information regarding the 13 factors comprising Natural Environment Factors and Socioeconomic Factors in **FEIS Table 2-8** has been grouped within a

topic according to whether the alternative is outside the Dallas Floodway or located primarily within its floodplain areas. The degree of similarity between floodplain Alternatives 3C and 4B and non-floodplain Alternatives 2A and 2B based on distinct underlying differences in environmental settings is sufficiently great as to substantially reduce the needless repetition of information that would otherwise occur if information relevant to two or more of the four alternatives were to be discussed separately.

2.8.4 Summary of Impact Assessments by EO Practicability Factor

The presentation of information regarding EO practicability factors that are shared by the 404 practicability analysis (**FEIS Appendix G-1**) is in **FEIS Section 2.8.4.1**. This section is followed by a summary of information about impacts expected by the four alternatives to the four Natural Environment Factors and the nine Socioeconomic Factors in **FEIS Sections 2.8.4.2** and **2.8.4.3**, respectively. As the EO practicability analysis generally summarizes the detailed evaluation of direct, indirect, and cumulative impacts for the Build Alternatives as presented in the SDEIS and/or LSS, references to the original NEPA document are included in the discussion of each EO practicability factor (including the SDEIS or LSS section number and page number where the source information for impact evaluations may be found).

2.8.4.1 EO/404 Practicability Shared Factors

Project Cost

As the FHWA has not developed detailed guidance as to how to assess project cost in an EO practicability analysis, the approach developed by the USEPA and USACE over several decades has been applied to be consistent with the 404 practicability analysis in **FEIS Appendix G-1**. This analytical approach is summarized in joint guidance issued by the USEPA/USACE on 404 practicability, which provides the following test for determining whether an alternative is practicable based on the cost standard:

> "The determination of what constitutes an unreasonable expense should generally consider whether the projected cost is substantially greater than the costs normally associated with the particular type of project." (USEPA/USACE, 1993) (emphasis added)

The assessment of whether the cost for a project alternative is practicable therefore depends on establishing a cost screen or threshold based on reasonably comparable projects. This approach seeks to define the range of the principal costs for a proposed project that may be readily compared to the costs incurred or estimated to construct a similar project.

Comparable tollway projects have been examined to form a basis for establishing the upper limit of the range of "normal costs" associated with new location tollways in urban areas. The projects considered all have the following aspects in common with the Trinity Parkway: each is a tollway at least 5 miles in overall length with four to six mainlanes; each is located within an urbanized area in Texas; each required substantial construction of project elements on bridge structures; and each is either a project that was completed within the past 10 years, or is in the advanced planning stage of development. Several projects meeting the foregoing criteria include three portions of the North Texas Tollway Authority's PGBT that were constructed in proximity to the Trinity Parkway, as follows (with year of completion shown): PGBT Segment IV from IH-35E to IH-635 (2005); PGBT Eastern Extension Sections 28-32 from SH-78 to IH-30 (2011); and Phase 4 of the PGBT Western Extension from N. Carrier Parkway to IH-20 (2012). In addition to the PGBT projects, the costs associated with the planned Cesar Chavez Border Highway West (CCBHW) in the City of El Paso have been considered in this analysis. The CCBHW is a four-lane tollway on new location that is currently under development by TxDOT. Although removed from the DFW Region, this project is comparable to the Trinity Parkway in terms of construction in an urban setting with numerous bridges and other structures. The CCBHW recently completed the NEPA process and is proceeding toward construction procurement. Cost component data used in this analysis were provided by NTTA for the PGBT projects and by TxDOT for the CCBHW.

The approach taken to evaluate the Trinity Parkway Build Alternatives follows USACE guidance and decision precedents that elaborate on what "cost" entails. First, cost does not include anticipated expenses relating to mitigation for natural resource impacts; such costs have been removed from the cost estimates for all of the Trinity Parkway Build Alternatives. Other environmental mitigation costs, such as estimates for hazardous materials abatement for building demolition or construction of noise reduction barriers, are included in construction costs. Second, only costs associated with the Trinity Parkway's "basic project purpose" are relevant. Although the FEIS includes several purposes of the project, the basic purpose used in the Section 404(b)(1) analysis of costs is as follows: To construct a new controlled-access roadway to help manage congestion from IH-35E, IH-30, and other existing transportation facilities in the project area to improve mobility and safety without incurring unreasonable costs. Costs associated with objectives related to project purposes (e.g., mitigating impacts to natural resources) were excluded in keeping with USACE practice. Third, USACE case precedents indicate that the analysis typically focuses on construction costs and ROW costs (which include costs of utility relocations); accordingly, other costs included in project cost estimates such as engineering design (which are typically a fractional estimate of construction costs) are not included for the

limited purpose of assessing practicability based on project costs. For example, construction and ROW/utility relocation costs for Trinity Parkway alternatives represents an average of 84 percent of the total estimated project costs. Again, the purpose is to establish a cost standard by which to judge whether a proposed alternative is practicable as measured against that cost standard; in this regard it is not important to capture all potential costs of a project, but identifying the principal costs (i.e., construction cost and ROW/utility relocation cost) facilitates the establishing a cost screen/standard. That is, all methods of estimating costs for transportation projects include construction and ROW/utility relocation costs, whereas other cost estimates or reports do not always include a breakdown of all other project-related costs. In this regard, consideration was given to including the costs of facility O&M after construction, but this cost element was excluded because it is not available for the comparable projects used to develop a cost screen. In addition, the annual cost for O&M for the Trinity Parkway Build Alternatives varies from $1.5M to $4.5M per year (see **LSS Table 4-32** and **LSS Appendix D**), indicating this would not be considered a major cost factor for purposes of developing a cost screen even if such data were available for comparable projects. Finally, costs to relocate 20 Oncor power transmission line towers recently constructed along Irving/Riverfront Boulevard were removed from the utility relocation estimates for Alternatives 2A and 2B, as it is USACE policy/practice to exclude the cost of undoing major actions that have been taken after identifying an alternative.

Applying the approach outlined above, **Table 2-9** shows the estimates (2011 dollars) for principal cost components based on the number of mainlane miles per project for the four Trinity Parkway Build Alternatives. Principal cost components based on either actual or estimated costs (CCBHW only) for comparable toll road projects are shown in **Table 2-10**. All cost estimates in **Table 2-10** have been adjusted to reflect 2011 dollars from the original year of the cost estimate (shown in the bottom row of the table). All costs have been rounded to the nearest million dollars.

TABLE 2-9. SUMMARY OF TRINITY PARKWAY PROJECT COST COMPONENTS

Project Feature (all costs in 2011 dollars)	**Trinity Parkway Alternatives**			
	2A	**2B**	**3C**	**4B**
Project Length (mainlane miles)	*52.8*	*52.8*	*52.8*	*53.0*
Construction Cost Total in $ millions (M) ($M/mainlane mile)	1,394 (26.4)	1,068 (20.2)	1,014 (19.2)	1,074 (20.2)
ROW/Utility Relocation Cost Total in $M ($M/mainlane mile)	593 (11.2)	512 (9.7)	142 (2.7)	103 (1.9)
Combined Above Costs in $M ($M/mainlane mile)	**1,987 (37.6)**	**1,581 (29.9)**	**1,156 (21.9)**	**1,177 (22.2)**

TABLE 2-10. SUMMARY OF COST COMPONENTS FOR COMPARABLE TOLL ROADS

Project Feature (all costs in 2011 dollars)	President George Bush Turnpike			Cesar Chavez Border Hwy West
	Segment IV	Eastern Extension Sec. 28-32	Western Extension Phase 4	
Project Length (mainlane miles)	*31.8*	*59.4*	*39.0*	*33.1*
Construction Cost Total in $ millions (M) ($M/mainlane mile)	256 (8.1)	564 (9.5)	404 (10.4)	464 (14.0)
ROW/Utility Relocation Cost Total in $M ($M/mainlane mile)	46 (1.4)	125 (2.1)	2 (0.04)	148 (4.5)
Combined Above Costs in $M ($M/mainlane mile)	**302 (9.5)**	**689 (11.6)**	**406 (10.4)**	**612 (18.5)**
Year of Original Cost Report or Estimate	2005	2013	2013	2012

As indicated in **Table 2-10**, the cost ranges appreciably among comparable toll road projects from $10 to $20M per mainlane mile. Although these projects are comparable to the Trinity Parkway in terms of the selection criteria, cost differences between major transportation projects will always occur because no two projects are identical. However, a qualitative examination of these projects has been made to provide insights into the variability in the observed construction and ROW/utility relocation costs. Most notably, the ROW/utility cost component for the PGBT projects is relatively small as compared to most Trinity Parkway alternatives and the CCBHW. This cost difference can be attributed to most of the ROW for the project was acquired or donated to TxDOT during the 1970s and 1980s. Decades later when the project was built, the ROW costs were unusually low because this already expended cost was not included in the project ROW cost reporting. For example, the extremely low ROW cost for the PGBT Western Extension Phase 4 is a result of acquisition of nearly all ROW prior to NTTA assuming responsibility for the project. Available reports indicate the NTTA made a lump sum payment of $458M to TxDOT for its previous work on all four phases of the Western Extension. However, a breakdown showing how much of this payment to TxDOT was for previously acquired ROW is not available. This suggests that the ROW component, which generally represents the bulk of the ROW/utility relocation cost, is under-represented in **Table 2-10** the Western Extension as well as possibly other segments of the PGBT.

Another major cost difference between the PGBT projects and the Trinity Parkway alternatives is that the cost of construction per mainlane mile for the Trinity Parkway is generally double the cost of the PGBT. Again, this difference is at least partially attributable to the early acquisition of land for the PGBT as this prevented development of much of the corridor in the decades between the time of ROW acquisition and construction. Thus, although the PGBT was constructed in an urban area, much of the corridor was undeveloped due to early acquisition of ROW. In contrast, a substantial component of the construction cost for the Trinity Parkway alternatives would be demolition of existing pavement and structures, as well as cost associated with the abatement of associated hazardous materials such as asbestos. However, the primary aspects that influence

construction cost for the Trinity Parkway alternatives are the numerous bridges, ramps, walls, embankments, and other structures that are relatively expensive contributors to overall cost. In comparison, a relatively greater amount of the PGBT was built as an at-grade facility in areas not as urbanized as downtown Dallas. In this regard, the CCBHW is quite comparable to the Trinity Parkway because of its predominance of structures in its design and its highly urbanized setting.

The foregoing evaluation of comparable toll roads suggests that the relatively low construction and ROW/utility relocation costs for the PGBT projects may be attributed to historical and design differences as compared to the Trinity Parkway. Thus, the comparatively lower cost per mainlane mile of $10M to $12M for the PGBT may be explained by referencing those differences as discussed above. The cost estimate for the CCBHW would have construction and ROW/utility relocation costs of $19M per mainlane mile, which is taken to approximate the higher end of the spectrum of "the costs normally associated with the particular type of project" (USEPA/USACE, 1993). Accordingly, it has been concluded that the effective cost screen in this FEIS is $20M per mainlane mile for combined construction and ROW/utility relocation costs, and that Trinity Parkway Build Alternatives with comparable costs that are "substantially greater" than this threshold are not considered to be practicable.

The difference between the Trinity Parkway alternatives and this cost screen, expressed in 2011 dollars and as a percentage increase above the cost screen, are shown in **Table 2-11**.

TABLE 2-11. APPLICATION OF COST SCREEN TO TRINITY PARKWAY ALTERNATIVES

Project Cost Estimate (all costs in 2011 dollars)	Trinity Parkway Alternatives			
	2A	2B	3C	4B
Construction and ROW/Utility Relocation Costs in $M/mainlane mile	37.6	29.9	21.9	22.2
Cost Screen for Construction and ROW/Utility Relocation Costs in $M/mainlane mile	20.0	20.0	20.0	20.0
Difference Between Alternative Cost Estimate and Cost Screen in $M/mainlane mile	17.6	9.9	1.9	2.2
Percent Difference Between Alternative Cost Estimate and Cost Screen	**88%**	**50%**	**10%**	**11%**

Existing Technology

All of the Trinity Parkway Build Alternatives could utilize current engineering technology for roadway and related construction, and there appears to be no unusual or insurmountable technological issues with any of the Build Alternatives. There is expected to be gradual adoption of new or improved technologies in the road building and toll collection fields over time. In general, any special technology (e.g., ITS) for the Build Alternatives is built into the cost estimates discussed above.

Logistics

A constraint influencing the EO practicability of the Build Alternatives involves several logistical elements related to construction, and the effects of such elements on level of difficulty to complete construction. An indicator of the collective effects of these logistical elements is the length of time from startup of engineering/construction activities until the Trinity Parkway could be fully open to traffic. This length of time is estimated to be 10 years for Alternative 2A, 9 years for Alternative 2B, and 6 years for Alternatives 3C and 4B. Substantial time to construct the Trinity Parkway would be required due to the large-scale, sequential tasks required for the construction process. Activities that most influence project schedule include ROW acquisition and relocations of displaced businesses and residences, environmental investigations and demolition of buildings, utility relocations, and traffic and safety issues. These elements are discussed further below.

ROW Acquisition and Relocations. As described in **SDEIS Section 4.5.1.2** (**SDEIS page 4-58**) and summarized in **Table 2-12**, the number of displacements and relocations varies widely among the Build Alternatives. It is estimated to take approximately 2 years to acquire ROW and relocate the 35 displaced commercial and residential buildings for Alternatives 3C or 4B. The time necessary to acquire ROW and arrange for relocation of displaced business and residents would be substantially longer for Alternatives 2A and 2B due the numerous displacements and relocations associated with these alternatives. This would lengthen project completion time because of the time needed to survey the affected parcels, appraise/negotiate each acquisition, complete eminent domain proceedings, as necessary, and provide relocation assistance in connection with displaced buildings.

TABLE 2-12. ESTIMATED NUMBER AND DESCRIPTION OF DISPLACEMENTS

Build Alternative	Residential Buildings	Commercial/ Industrial Buildings*	Pump Stations/ Levee Operations Office Buildings	Police and Fire Station Buildings	DISD Facility Buildings	Total
2A	8	272	1	2	2	285
2B	6	228	5	2	4	245
3C	6	29	---	---	---	35
4B	11	24	---	---	---	35

Notes: --- = no impact

* The number of displaced buildings/structures is shown in this table; however, the number of individual businesses displaced may be higher due to multiple tenants in some buildings.

Environmental Investigations and Demolition. The number and types of property acquisitions also affect the schedule indirectly because there are several tasks that must follow sequentially, such as Environmental Site Assessments (ESAs; Phase 1 and Phase 2 ESAs as appropriate), remediation, and demolition. Accordingly, the larger the number of sites considered high risk for

hazardous materials, the longer it may be expected to take before construction may begin. Based on the assessment of hazardous materials sites in **SDEIS Section 4.17.2** (**SDEIS page 4-190**), the following number of high risk hazardous material sites are associated with each of the Build Alternatives: Alternative 2A, 34 sites; Alternative 2B, 35 sites; Alternative 3C, 17 sites; and Alternative 4B, 16 sites.

Utility Relocations. Alternatives 2A and 2B have extensive water lines, sanitary sewer lines, fiber optic cables, and high voltage electrical overhead transmission lines, which would need to be coordinated and removed from the ROW**.** As discussed in **SDEIS Section 4.18.2 (SDEIS page 4-194)**, the alternatives would require major water line relocations of varying lengths, as indicated in the following estimates: Alternative 2A, 40,300 linear feet; Alternative 2B, 40,500 linear feet; Alternative 3C, 1,600 linear feet; and Alternative 4B, 2,900 linear feet. Impacts in terms of linear feet of relocated sanitary sewer lines among the alternatives would be as follows: Alternatives 2A and 2B, 11,700 linear feet each; and Alternatives 3C and 4B, 2,000 linear feet each.

The anticipated relocation of electrical utilities for all Build Alternatives is described in **SDEIS Table 4-48** (**SDEIS pages 4-192** and **4-193**). Alternative 4B would affect seven major electrical lines, Alternative 3C would affect six electrical lines, and Alternatives 2A and 2B would affect five electrical lines each. In addition, Alternative 2B would be the only alternative that would require the relocation of an electrical substation. As reported in the SDEIS, electrical utility relocations are considered typical for a project of this magnitude and are not considered logistical constraints, nor would they be expected to negatively impact the project schedule. However, as described below, the construction of an Oncor transmission line subsequent to the SDEIS would affect logistical constraints for Alternatives 2A and 2B, but would not be affected by Alternatives 3C or 4B.

The major impact on logistics and schedule for both Alternatives 2A and 2B affects the electric transmission lines in the corridor, particularly the 345 kilovolt (kV) line listed in **LSS Sections 4.1.4.4** and **4.1.5.4** (**LSS pages 4-12/4-13** and **4-35/4-36**). The Oncor 345 kV transmission line (completed in 2010) is located in the median of Irving Boulevard from Regal Row to Sylvan Avenue, and includes provision for a 138 kV line hung below the 345 kV conductors on the same poles. The pole line is positioned in the median of Irving Boulevard (rather than along the ROW edge of either street) to provide sufficient horizontal clearance to properties and buildings located along both sides of the street. Both 138 kV and 345 kV lines would have to be rebuilt (new taller structures and associated foundations) and possibly relocated as part of the construction for Alternatives 2A and 2B. The 345 kV line is particularly important because it provides an electrical

source to two major switching stations serving the CBD and adjacent neighborhoods, portions of Oak Cliff, West Dallas, and the Stemmons Corridor, and also provides bulk power flow for the Texas electrical transmission grid.

The 345 kV electric transmission line adds to the logistical challenge of constructing Alternatives 2A and 2B because an alternative alignment analysis may be necessary and a replacement line must be fully installed in the new position, requiring acquisitions, demolitions, utility relocations, and partial road construction as pre-requisites. Also, once fully installed, the switch-over from the old line to the new line must be scheduled during periods of low electrical demand. For example, it is usual practice that no outages will be allowed during peak load season (April 1 - October 15). The Electric Reliability Council of Texas (ERCOT) has final authority over outage scheduling.

Traffic and Safety. As discussed in **SDEIS Section 4.20.1** (**SDEIS pages 4-197/4-198**), construction activity for all of the Build Alternatives would result in temporary traffic disruptions (closures and detours) on major freeways and arterials in the project area. This interference with normal traffic patterns would be particularly acute during rush hour and other periods of localized congestion. Safety and security issues may include temporary disruption of access for emergency and law enforcement vehicles. Within the project area, Irving/Riverfront Boulevard is a highly utilized roadway and construction activities associated with Alternative 2A or 2B would result in an unusually high level of traffic disruption to the urban area served by this roadway. Heavy vehicle movements, possible hazardous waste excavation and transport, and construction site activity would also create potential safety concerns that contribute to the differences in the length of the estimated period of construction among the Build Alternatives.

Influence of Construction Site Location. Alternatives 3C and 4B would have scheduling risks, which are inherent with construction in areas subject to flooding. The potential effects of construction within the Dallas Floodway were considered in terms of affecting logistical aspects of the project; however, based on construction of other projects in recent years, periodic flooding has not been a serious impediment to work in the Dallas Floodway. There are many examples of successfully completed projects in the Trinity River floodplains including channel widening in the Dallas Floodway by the City of Dallas in the early 2000s and the reconstruction of the Westmoreland and Hampton Road Bridge Crossings. Additionally, various components of the USACE DFE Project have been completed downstream of the Dallas Floodway. The Dallas Floodway is typically subject to intermittent rains and possible flooding in the spring and fall, but there are long periods of low flows and dry conditions, particularly in summer. It is expected the grading contractor could beneficially use low flow periods in the Dallas Floodway to complete the required excavation and embankment included in Alternatives 3C and 4B. Considering an 18-

month grading period, accumulated delays due to wet conditions would not be expected to exceed 6 months in the worst case. Further, once the Trinity Parkway embankments have been established, the work area would be expected to be adequately protected from flooding events.

2.8.4.2 Natural Environment Factors

Natural and Beneficial Values Served by Floodplains

Fish and wildlife diversity and density within floodplains strongly correlate with aquatic habitat and vegetation diversity considered along with the type, degree, and frequency of disturbances. Therefore, aquatic habitat and vegetation impacts are used as an indicator of the natural and beneficial values served by floodplains.

Alternatives 2A and 2B avoid the Dallas Floodway area except for a small segment in the southern part of the corridor downstream of Corinth Street. The total amount of area within the 100-year floodplain affected by these alternatives would be 55 acres for Alternative 2A and 76 acres for Alternative 2B. Neither of these alternatives would result in longitudinal encroachment within the Dallas Floodway. These alternatives would have the vegetation and aquatic habitat impacts shown in **Table 2-13** (see **SDEIS Section 4.9.2.2, SDEIS page 4-114**). For the most part, Alternatives 2A and 2B occupy developed land, with crossings of grass and open water areas at man-made sumps in the corridor. Alternatives 2A and 2B would not be expected to cause substantial impacts on floodplain values related to fish, wildlife movement, available open space, opportunities for scientific study, outdoor recreation potential, or groundwater recharge. Floodplain areas outside of the Dallas Floodway are expected to be unaffected because such areas would be crossed by bridges (see **SDEIS Section 4.13.5, SDEIS page 4-141**).

TABLE 2-13. ACREAGE OF POTENTIAL IMPACTS TO VEGETATION/HABITAT

Build Alternatives	Woodland (non-wetland)	Aquatic Habitats*		Maintained Grass Areas	Total Undeveloped Area Impacts
	Riparian Forest	Waters of the U.S., Incl. Wetlands	Man-Made Linear Sumps		
2A	---	4.2	---	11.9	20.7
2B	---	9.1	---	31.1	46.6
3C**	6.7	27.4	0.01	209.8	256.7
4B**	5.9	47.1	0.1	314.8	377.5
Potential Borrow Areas**	13.8	63.5	---	258.3	335.6

Notes:
1. All quantities are shown in acres and reflect impacts as reported in the SDEIS (2009), as supplemented by the LSS (2012). Calculated areas are estimates only.
2. Potential impacts to waters of the U.S., including wetlands, may occur from bridge column construction and can be addressed during final design.
3. **---** = No impact anticipated for this alternative.

*** =** Includes impacts associated with drainage sumps, open water, and river channel, some of which would be spanned by bridges.

**** =** Build Alternatives that would also require excavation from the potential borrow areas shown at the bottom of the column.

The ROW footprint for Alternatives 3C and 4B would be expected to have floodplain encroachments of 297 acres and 418 acres, respectively. Excavation areas necessary for embankment fill and other construction purposes would affect an additional 336 acres for both of these alternatives. As described in **SDEIS Section 4.9.2.3** (**SDEIS page 4-115**), there would be impacts from Alternatives 3C and 4B on floodplain values related to wildlife movement, open space loss, and outdoor recreation potential due to the construction, operation, and maintenance of the new ROW (see **Table 2-13**). However, many of the natural values of the floodplain in the project area have already been altered by the creation of the Dallas Floodway levee system and the regular O&M of that system. The Dallas Floodway is not utilized for forestry or agriculture, and Alternatives 3C and 4B would have no impact on these types of values that are sometimes associated with floodplains.

In addition to significant area encroachments, Alternatives 3C and 4B result in substantial longitudinal encroachments within the Dallas Floodway. Alternative 3C is located along the inside of the levee to the north of the Trinity River, and extends approximately 5.2 miles parallel with the levee. Alternative 4B is located along the inside of both levees that flank the Trinity River and has a combined (i.e., both sides of the river) longitudinal encroachment of approximately 9.9 miles. These longitudinal encroachments extend from approximately 500 feet upstream of the Hampton/Inwood Bridge to 500 feet south of the MLK Bridge. Although these longitudinal encroachments are lengthy, the physical features of the Dallas Floodway and the design of these

alternatives effectively alleviate any substantial interference with the ability of the Dallas Floodway to convey floodwaters. Both of these Build Alternatives would be built upon embankments that would elevate the roadways above the 100-year floodplain; both alternatives would be designed to afford approximately 2 feet of freeboard above this level of flooding. The roadway embankments would be constructed on material excavated within the Dallas Floodway to effectively result in a hydraulically neutral design in terms of floodwater surface elevations and valley storage. The construction of either of these alternatives would also be compatible with flood events that are expected to occur with less frequency than the 100-year flood. The straight river channel and nearly level and very broad floodplain within the Dallas Floodway allow floodwaters from extreme runoff events to move between the levees at low velocity. Such extreme events would inundate Build Alternatives 3C and 4B, resulting in road closure during high water periods and after water recedes to allow clean up of debris. These alternatives would be protected by a security wall held in place by large concrete blocks (i.e., gravity wall that would not be secured in place by adjacent embankment) to ensure its integrity during extreme flooding events. Consequently, the design of these alternatives anticipates inundation on rare occasions without substantial impacts to the facility.

Waters of the United States, including Wetlands, and Water Quality

LSS Sections 4.1.4.7 (LSS page 4-16) and **4.1.5.7 (LSS page 4-38)** describe the assessment of the waters of the U.S., including wetlands, that are found within the project area for Alternatives 2A and 2B, respectively. **LSS Section 4.1.6.7 (LSS page 4-62)** and **4.1.7.7 (LSS page 4-88)** describes the assessment of the waters of the U.S., including wetlands, that are found within the project area for Alternatives 3C and 4B, respectfully. This discussion includes the results of the jurisdictional determination approved by the USACE on March 24, 2011.

Alternatives 2A, 2B, 3C, and 4B would impact waters of the U.S., including wetlands, due to filling and/or excavation, and a summary of these impacts is in **Table 2-14**, and reflect a summary of the detailed impacts assessment included in **SDEIS Section 4.8** (**SDEIS pages 4-107** to **4-111**). All of these alternatives would comply with applicable water quality and water quantity regulatory requirements as outlined in **SDEIS Section 4.12.1 (SDEIS page 4-123)**. Losses associated with Alternatives 3C and 4B are predominately associated with a number of periodically inundated wetland depressions that are dry during portions of the year. **SDEIS Section 7.4 (SDEIS page 7-14)** provides discussion of measures to avoid, minimize, or mitigate such impacts. **SDEIS Appendix J** contains materials relating to mitigation that would be required under CWA Section 404.

TABLE 2-14. SUMMARY OF POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

Build Alt.	Emergent Wetlands		Forested Wetlands		Open Water - Intermittent*		Old Trinity River Channel		Intermittent Stream		Trinity River*		Total	
	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.
2A	--	--	1.38	--	--	--	2.72	--	0.13	--	--	--	4.23	--
2B	--	--	2.53	--	--	--	6.34	--	0.20	--	--	--	9.07	--
3C	17.01	20.63	1.28	--	4.45	2.53	1.51	--	0.15	--	2.98	40.35	27.38	63.51
4B	35.77	20.63	1.28	--	5.79	2.53	1.21	--	0.10	--	2.98	40.35	47.13	63.51

Notes:
1. All quantities shown in acres and reflect impacts as reported in the SDEIS (2009), as supplemented by the LSS (2012). Calculated areas are estimates only. "**Fill**" impacts are expected from roadway construction; excavation ("**Ex**.") impacts are expected from potential borrow areas (see **SDEIS Plate 4-26** for borrow area locations).
2. Expected impacts are based on the jurisdictional determination approved by USACE on June 19, 2006 (File # SWF-2000-00308).
3. **--** = No impact anticipated for this alternative.

* Potential impacts to waters of the U.S., including wetlands, may occur from bridge column construction and can be addressed or eliminated during final design.

A functional analysis was performed for waters of the U.S., including wetlands, in the project area using a hydrogeomorphic approach consistent with that described in the USACE's Wetlands Research Program Technical Report WRP-DE-11, *A Guidebook for Application of Hydrogeomorphic Assessments to Riverine Wetlands*. As noted in **SDEIS Section 3.4.6 (SDEIS page 3-77)**, the waters of the U.S., including wetlands, in the project area provide a range of functions with each level of function dependent on a range of variables. One function that would be affected is that of long-term surface water storage. This function is dependent on the ability of the waters of the U.S., including wetlands, to receive and retain water for an extended period during the growing season, of which all waters of the U.S., including wetlands in the study area are highly capable.

The Dallas Floodway is regularly mowed which is necessary to maintain flood conveyance capabilities. In doing so, the required maintenance mowing of the Dallas Floodway prohibits the development of riverine emergent wetlands into forested riverine wetlands, limiting the ability of the wetlands to function in general. The existing level of aquatic function associated with vegetation characteristics (e.g., vegetative communities, interspersion, and connectivity) is relatively low.

The typical water quality concerns associated with construction activities are erosion and sedimentation. The potential for erosion and sedimentation is accelerated when vegetation is cleared in preparation for the construction of the roadway, as exposed ground is susceptible to erosion. Alternatives 3C and 4B require the crossing of several water bodies within the project area, including the Trinity River and its network of drainage sumps and tributaries. In the area of the Dallas Floodway, Alternative 3C and 4B construction areas would be subject to possible

inundation by periodic river flooding, in addition to direct effects of rainfall and runoff. Bridge construction also has the potential to create soil erosion, which could affect sedimentation and turbidity of water. Eroded sediment may then redeposit downstream, resulting in the disruption of the aquatic ecosystem and water quality degradation. In addition, increased pavement area and vehicular traffic over the life of the project have the potential to discharge storm water pollutants to the water bodies and wetlands that could negatively impact the quality of surface water.

Water quality impacts of construction would be reduced to acceptable levels by compliance with the regulatory standards of applicable construction stormwater management permits, and water quality related impacts of the paved roadway would also be managed in accordance with appropriate permit terms specified by regulatory agencies. Detailed discussions of federal and state permits related to the abatement of water quality impacts are found in **SDEIS Section 7.2 (SDEIS page 7-10).** Additional discussions regarding regulatory controls of water quality impacts are included in **SDEIS Appendix H** (Preliminary Section 404(b)(1) Guidelines Evaluation), and **SDEIS Appendix I** (TCEQ Section 401 Water Quality Certification Questionnaire).

Fish and Wildlife Habitat Values

SDEIS Section 4.9 (**SDEIS pages 4-112** to **4-120**) presents a quantitative assessment of impacts to habitat, wildlife, and threatened and endangered species. Much of the discussion centers on impacts to vegetation with riparian woodlands and aquatic habitat identified as "highest quality wildlife habitat." The acreage figures in **Tables 2-13** and **2-14** reflect the greatest amount of potential impacts to undeveloped land cover types in the project area, which includes both temporary and permanent impacts to existing vegetation cover and aquatic habitat.

The level of impacts at a specific site would vary widely. Alternatives 2A and 2B have the potential to impact undeveloped areas. Wildlife habitat would also be impacted by habitat fragmentation in relation to the amount of cleared vegetation for each of the non-floodplain alternatives. For Alternatives 3C and 4B, the level of impacts would vary because approximately half of the areas of undeveloped area impacts are not associated with the construction of paved surfaces. That is, an estimated 335.6 acres of excavated areas for borrow material to construct tollway embankments would be revegetated with native grasses, and none of these areas would be paved. In addition, approximately half of the ROW areas for both Dallas Floodway alternatives would be needed for at-grade and bridge paved surfaces, leaving the remainder of ROW areas to be generally revegetated with native grass vegetation. Although an additional fraction of the ROW would be used to create a gravel surface service road for facility maintenance, the bulk of unpaved ROW would be maintained as grass cover after construction of the proposed project. The precise mix of paved/hardened surface and vegetated areas within the ROW would not be

determined with precision until final design; however, a substantial portion of land within the ROW for these alternatives would be restored to vegetation cover that is either similar to or improved from the existing condition.

Mitigation for impacts to these habitats during and after construction would include efforts to avoid and minimize impacts as well compensatory mitigation such as wetland restoration or purchase of credits from an USACE-approved mitigation bank. A detailed discussion of mitigation relating to these resources is included in **SDEIS Section 3.3 (SDEIS page 7-12).** A preliminary mitigation plan is included in **SDEIS Appendix J,** which discusses protective measures to be followed during construction to avoid/minimize impacts and a mitigation planting plan, which addresses the planting of riparian trees and native grass areas for long-term compensation for habitat impacts.

U.S. Fish and Wildlife Service (USFWS) concurred on March 2, 2009 with the 'may affect, but not likely to adversely affect' determination regarding the interior least tern, a federally- and state-listed endangered species. Ongoing coordination with Texas Parks and Wildlife Department (TPWD) would occur during the FEIS process regarding potential impacts to state-listed species. Adverse impacts to protected species are not anticipated for any of the four Build Alternatives.

Conservation

SDEIS Sections 4.19 (SDEIS page 4-195) and **4.22 (SDEIS page 4-204)** include general discussions regarding transportation-related energy use and the commitment of resources. For the implementation of all Build Alternatives, energy, fuel, and materials consumption would occur during construction and operation. The highway construction materials that would be expended are not in short supply and therein construction would not adversely affect continued availability of similar resources. This alternative would operate as an all-electronic toll collection facility, which provides operational efficiencies to reduce stop and go traffic conditions. This would result in lower fuel/energy consumption. When correlating the measures of effectiveness in **SDEIS Section 4.4.1.3 (SDEIS page 4-53)** to energy use, managing congestion delay and vehicle hours traveled means lower fuel and energy use. The energy requirements associated with Alternatives 2A, 2B, 3C and 4B are not considered functional constraints to practicability.

2.8.4.3 Socioeconomic Factors

Needs and Welfare of the Community

The Trinity Parkway is a high profile project that, for about the past 45 years, has involved numerous stakeholders and individuals along the corridor in the project development process. **FEIS Section 1.1.2** summarizes this long process of project planning and evaluation. Effects of

the proposed project on the local community are major factors in determining practicability of Alternatives 2A, 2B, 3C, and 4B.

Social Impacts: The numerous displacements that are anticipated with Alternatives 2A and 2B would have direct and indirect impacts on neighborhoods and commercial districts within the project corridor. In accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, relocation assistance would be provided to any person, business, farm, or non-profit organization displaced as a result of the acquisition of real property for public use (see **SDEIS Appendix C**). The acquisition of these properties could have adverse social consequences in the local community beyond a typical urban roadway project. For instance, the Dallas Design District is a collection of home interior businesses, which collectively advertise their goods and services as a destination shopping experience. Although the displaced businesses would receive appropriate relocation compensation, the remaining district would be substantially impacted by the community dividing impacts of a controlled access facility.

Alternatives 3C and 4B generally avoid impacts to neighborhoods and commercial districts within the project corridor, since much of the alignment is within the Dallas Floodway. **FEIS Table 2-12** provides a summary of the residences, commercial buildings, and public facilities that would potentially be displaced under each of the Alternatives. **SDEIS Appendix C** provides a detailed listing of the same relocations.

General Public Opinion: **FEIS Section 1.1.2** describes two well-publicized citywide elections in which Dallas residents expressed support for a Trinity Parkway location within the Dallas Floodway.

(i) May 2, 1998 - Dallas voters approved the issuance of General Obligation Bonds including $84 million for the Trinity Parkway, a reliever route within the Dallas Floodway levee system (City of Dallas, 1998a), and

(ii) November 6, 2007 - Dallas voters rejected a petition calling for prohibition of construction, maintenance, or improvement of certain roadways (i.e. Trinity Parkway) within the Trinity River levees from Westmoreland Road to IH-45.

Alternatives 2A and 2B are inconsistent with the majority of voters' opinions, and Alternatives 3C and 4B are consistent with the views of the electorate expressed in these elections that supported a Trinity Parkway location within the Dallas Floodway.

Stakeholder Opinions: Strong opposition to non-floodplain alternatives and strong support for a floodplain alternative, specifically Alternative 3C, were communicated during the official comment periods for the DEIS, SDEIS, and LSS; very few comments were received regarding Alternative 4B. In addition, many comments were received without any regard to a specific alternative that communicated concerns regarding habitat loss, impacts to wildlife, and impacts on water and air quality. The statements received during the DEIS, SDEIS, and LSS public hearing comment periods are included in **FEIS Appendices K, L, and M**, respectively**. FEIS Appendices L-2 and M-2** contain summarized comments from the SDEIS and LSS public hearings that have been extracted from original statements and organized by topic and subtopic, and include references to resource agency statements where applicable.

Key issues cited by the public as adverse impacts of Alternatives 2A and 2B include: a high number of displacements and relocations, disruption of established businesses along Irving/Riverfront Boulevard, adverse impacts to community resources, and increased traffic on adjacent streets. Statements submitted by the general public expressed concern that Alternatives 2A and 2B would have "destructive impacts" (or similar) to the established businesses and residential communities in the area. City of Dallas Council members and the Mayor submitted public comments opposing Alternatives 2A and 2B. Business associations, which represent hundreds of local businesses, also submitted comments in opposition to Alternatives 2A and 2B. These local groups included Dallas Regional Chamber Transportation Council, Dallas Black Chamber of Commerce, DOWNTOWNDALLAS, Stemmons Corridor Business Association, The Real Estate Council, Trinity Improvement Association, Mixmaster Business Association, and the West Dallas Chamber of Commerce.

There were numerous statements submitted by the general public expressing support for Alternative 3C. Council members and the Mayor submitted public comments in support of Alternative 3C. Business associations, which represent hundreds of local businesses, also submitted comments in support of Alternative 3C. These groups included Dallas Regional Chamber Transportation Council, Dallas Black Chamber of Commerce, DOWNTOWNDALLAS, Stemmons Corridor Business Association, The Real Estate Council, Trinity Improvement Association, Mixmaster Business Association, and the West Dallas Chamber of Commerce. Stated reasons for support of Alternative 3C included: (i) it is the lowest cost alternative, (ii) the design is compatible with the BVP, and (iii) the alternative would cause only minor impacts to the local businesses.

Numerous statements submitted by the general public, as well as agencies such as USEPA and TPWD, communicated concerns for habitat loss, impacts to wildlife, and impacts to water and air

quality from the construction of the Trinity Parkway, regardless of which alternative. Statements regarding impacts to habitat and wildlife expressed concerns ranging from the opposition to the destruction of habitat, with many commenters voicing the following: support for the No-Build Alternative; the necessity of implementing adequate mitigation measures for habitat loss; and requests for additional biological surveys to more thoroughly address impacts to species that would be affected by habitat loss. Statements regarding impacts to water and air quality included questions as to whether the Trinity Parkway's effects on water runoff from the tollway and increased vehicle emissions would exacerbate water and air pollution within the region.

Future Land Use Plans: The Dallas City Council approved the renaming of Industrial Boulevard to "Riverfront Boulevard" in November 2008 and local business owners consider this a positive influence to support mixed-use redevelopment in the area. A section of Riverfront Boulevard from Cadiz Street to Continental Avenue (approximately 1.5 miles) is already under design by Dallas County, in cooperation with the City of Dallas, for reconstruction as a landscaped, bicycle and pedestrian-friendly parkway that will accommodate future streetcars. There is also on-going private development in the corridor (although the pace may have slowed due to national economic conditions). As reported in **SDEIS Section 3.1.1.1 (SDEIS pages 3-5 through 3-7)**, tax-increment financing (TIF) districts have been created for the Cedars and Design Districts to promote mixed-use redevelopment. Development includes commercial infill development in the Design District, as well as infill of residential lofts and similar development along the corridor. These new developments may increase the cost and complexity of acquiring properties for Alternatives 2A and 2B over time. Alternatives 3C and 4B would not conflict with these development plans and would enhance mobility to developed areas.

The City of Dallas has widely publicized its "Trinity River Corridor Project," which is actually the name for a series of proposed projects that are along the main stem and Elm Fork of the Trinity River in Dallas. Since 2003, the city has planned for Trinity Parkway to have a combined parkway riverside layout, balancing the Trinity Parkway embankments with proposed excavation of lakes in the Dallas Floodway as part of the city's Trinity River Corridor BVP (City of Dallas, 2003a). Since 2007, the design work of the city's Trinity Lakes Consultant Team has been based on this plan, impacting multiple design decisions such as physical layout of the lakes, trails, public spaces and access points, the hydraulic modeling, and the earthworks plan. The city's BVP must be evaluated and found to be environmentally acceptable and technically sound by the USACE before the plan can be implemented. Alternatives 2A, 2B, and 4B are inconsistent with current plans for the BVP and fail to achieve the project objective f achieving compatibility with local development plans. Alternative 3C is consistent with the BVP.

At the regional level, all of the Build Alternatives would meet the criteria for regional plans such as the 2014-2016 TIP and *Mobility 2035 – 2013 Update*. That is, regional planning documents generally factor in the conceptual aspects of the proposed Trinity Parkway, rather than the individual alternatives under consideration.

***Impacts on the Stemmons Deed Precedent*:** There has been a longstanding intent in Dallas to include a major roadway in the Dallas Floodway, most notably derived from the Stemmons Deed Precedent. The 1972 donation of 930 acres of Dallas Floodway land to the city by Industrial Properties included the following language in the escrow agreement: "*It is the desire of Industrial [Properties] and of the City that all such lands situated within the floodway as above described be made available for parks, open space, recreational, and transportation facilities as set out below,"* … *"All of said lands so acquired… shall be used for parks, open space, recreational, transportation facilities, including roadways on and adjacent to the levees, and such uses as are necessarily incident to the navigation channel, and all of which uses shall be generally consistent with the concept of the Coordinated Plan for Open Space Development of the Trinity River System of the Dallas Park Board dated December 9, 1969 and adopted by the Park Board and approved by the City Council on March 9, 1970."* (City of Dallas Park Board Resolution 72-0126, dated January 10, 1972). Further, the 1974 purchase of remaining lands in the Dallas Floodway by the city included this same provision regarding transportation facilities. Alternatives 2A and 2B are not consistent with these historic and ongoing community intentions. Alternatives 3C and 4B are consistent with the intended use as outlined in the deed.

Economic Impacts

LSS Sections 4.1.4.1, 4.1.5.1, 4.1.6.1, and 4.1.7.1 (LSS pages 4-7, 4-30, 4-52, and **4-79)** provide data regarding the impacts that Alternatives 2A, 2B, 3C and 4B would have on displacements and the local economy. **FEIS Table 2-15** provides a summary of the estimated number of businesses and jobs that would potentially be displaced under each of the alternatives.

TABLE 2-15. ESTIMATED NUMBER OF BUSINESS AND JOB DISPLACEMENTS

Build Alternative	Businesses	Jobs
2A	285 to 304	6,437 to 6,640
2B	220 to 289	6,182 to 6,655
3C	15 to 20	72 to 203
4B	13 to 16	62 to 187
Notes: Information was obtained from Dun & Bradstreet by the City of Dallas, Office of Economic Development, Research & Information Division (January 2010).		

Although various positive economic impacts would be expected to benefit the City of Dallas' economy during the construction phase of the project, displacements within the Design District

due to Alternatives 2A and 2B would have a significant negative impact on economic aspects of this area both immediately and over the long-term. Alternatives 3C and 4B would also have adverse impacts on businesses and jobs.

The location and particular nature of adverse effects of Alternatives 2A and 2B warrants separate consideration. These impacts would be due to the acquisition of existing buildings, primarily active commercial and industrial businesses, and conversion of this land to transportation use that is essential to the long-term vision and economic vitality of the Design District as well as the transit-oriented development (TOD) farther east. Indirect impacts to the local economy would derive from the dividing effects of a controlled access tollway along the Irving/Riverfront Boulevard to these areas that have experienced dramatic economic growth in recent years. Such growth may be attributed to decades of planning by the City of Dallas to attract investors to redevelop aging buildings in the Design District. The City of Dallas has long been invested in the long-term economic viability of such areas by offering tax incentives, as the creation of TIF Districts stimulates private development/redevelopment within and near the project corridor (see **SDEIS Section 3.1.1.1, SDEIS (pages 3-5 through 3-8)**.

The availability of vacant land for new business development and/or relocation is relatively limited within the project area. In order to redevelop within the Design District, the density of existing development would have to increase from current conditions in order to offset the net loss of 127 acres (Alternative 2A) to 206 acres (Alternative 2B) of mostly developed land that is privately owned (see **LSS Section 4.1.4.1 and 4.1.5.1**). Loss of businesses in the area is expected to lead to the loss of over 6,000 jobs as a result of the construction of Alternatives 2A and Alternative 2B (see **FEIS Table 2-15**). Many of these jobs and businesses could be permanently lost if displaced businesses cannot relocate within the same geographic area, or decide for other reasons to cease operations and employees are unable to find similar work. The construction of Alternatives 2A and 2B would also impact the remaining commercial buildings adjacent to the roadway. The impacts would primarily involve access and traffic circulation challenges over the construction period, which would affect business activity throughout the corridor (see **SDEIS Section 4.20.1**). The construction of the Trinity Parkway primarily within the floodplain (i.e., Alternatives 3C and 4B) would generally avoid these significant commercial and residential displacements, and loss to the City of Dallas tax base and annual tax revenue for the combined taxing entities (Dallas County, City of Dallas, and DISD). A summary of tax value losses due to displacements and acquisition for each of the alternatives is shown in **Table 2-16**.

TABLE 2-16. TAXABLE VALUE LOSSES DUE TO DISPLACEMENTS AND ACQUISITIONS

Build Alternative	Total Taxable Value Loss	Combined Tax Revenue Loss Per Year
2A[1]	$379 million	$10.3 million
2B[2]	$306 million	$8.3 million
3C[3]	$54 million	$1.5 million
4B[4]	$36 million	$1.0 million

Notes: Total taxable value losses due to displacements and acquisitions for each of the alternatives are estimated in 2011 dollars.

1. See **LSS Table 4-3** (**LSS page 4-8**) for additional information.
2. See **LSS Table 4-11** (**LSS page 4-31**) for additional information.
3. See **LSS Table 4-19** (**LSS page 4-53**) for additional information.
4. See **LSS Table 4-26** (**LSS page 4-80**) for additional information.

Alternatives 3C and 4b would result in the net loss of 157 acres (Alternative 3C) to 167 acres (Alternative 4B) of mostly developed land that is privately owned (see **LSS Section 4.1.6.1 and 4.1.7.1**). Loss of businesses in the area is expected to lead to the loss of over 60 jobs as a result of the construction of Alternatives 3C and 4B.

Air Quality Impacts

NCTCOG serves as the Metropolitan Planning Organization (MPO) for transportation in the DFW area. Since the early 1970s, MPOs have had the responsibility of developing and maintaining a MTP. The MTP is federally-mandated; it serves to identify transportation needs, and guides federal, state, and local transportation expenditures. The MTP at the time of the LSS was titled *Mobility 2030: The Metropolitan Transportation Plan for the Dallas-Fort Worth Area*. The MTP must conform to the SIP for air quality as required by the federal Clean Air Act (CAA).

Six pollutants are of primary concern with regards to air quality in urban areas. These include: ozone (O_3), CO, sulfur dioxide, nitrogen dioxide, particulate matter, and lead. The USEPA establishes NAAQS for these identified air pollutants. These standards represent exposure levels where potential threats to human health may occur. The health risk from air pollutants is generally determined on a regional basis, with the USEPA designating areas where the potential for threat to human health exists as a non-attainment area for specific air pollutants. The USEPA-designated ten-county DFW area (including Dallas County) is in non-attainment only for ozone. The Trinity Parkway is one of many congestion management measures regional planners are pursuing to reduce levels of ozone. Unlike ozone, concentrations for carbon monoxide are readily modeled for highway projects and are required by federal regulations. A carbon monoxide analysis for the proposed project determined that local concentrations of carbon monoxide are not expected to exceed federal standards at any time (see **SDEIS Section 4.14.3.1**).

In addition to the criteria air pollutants discussed above for which there are NAAQS, the USEPA also regulates air toxics. An analysis of MSAT within the Trinity Parkway study area considered

the on-road sources for the several priority MSAT. The quantitative MSAT analysis showed a substantial decrease in daily MSAT emissions for the Trinity Parkway Build and No-Build scenarios in 2030 compared to the base year of the analysis (2007). In fact, if emissions are plotted over time, a substantially decreasing level of MSAT emissions can be seen even though overall vehicle miles traveled (VMT) will continue to rise (see **Figure 4-2C** of the SDEIS). This is due in large part to the implementation of USEPA's motor vehicle emission control standards, described in **Section 4.14.5.1** of the SDEIS.

Based on assessments in **SDEIS Section 4.14 (SDEIS page 4-145)** and **SDEIS Section 4.15.5 (SDEIS page 4-170)**, no adverse air quality impacts are anticipated from any of the alternatives.

Traffic Noise Impacts

The FHWA's traffic noise modeling software was used to calculate existing and predicted traffic noise levels at receiver locations that represent the land use activity areas adjacent to the proposed project. These areas might be impacted by traffic noise and could potentially benefit from feasible and reasonable noise abatement. All of the Build Alternatives merge together at both the north and south termini of the project area. As a result, traffic noise impacts to 126 noise receivers (125 residences and one park [Sleepy Hollow Park]) are common to each Build Alternative. For a summary of anticipated traffic noise impacts to receivers, refer to **FEIS Table 2-17** below (**SDEIS Section 4.15.5 (SDEIS page 4-170)**). Potential noise mitigation is described in **SDEIS Chapter 7 (SDEIS page 7-6)**.

TABLE 2-17. SUMMARY OF NOISE IMPACTS

Build Alt.	Single-Family	Multi-Family	School	Park	Community Center	Church	Total
2A	208	0	0	1	0	0	**209**
2B	201	0	0	1	0	0	**202**
3C	127	0	0	1	0	0	**128**
4B	164	0	0	2	0	0	**166**

Impact of Floods on Human Safety

Alternatives 2A and 2B would be located within the levee protected area on the landside of the existing Dallas Floodway East Levee and the proposed Lamar Levee, except for elevated bridge crossings in the southern segment that would be designed to avoid increases in flood elevations and loss of valley storage. Therefore, Alternative 2A (see **LSS Section 4.1.4.13, LSS page 4-24**) and Alternative 2B (see **LSS Section 4.1.5.13, LSS page 4-47**) meet the 1988 ROD hydrologic and hydraulic criteria.

Alternatives 3C and 4B would be located within the Dallas Floodway for approximately 70 percent of its length. Within the Dallas Floodway, the mainlanes are proposed to be protected from

inundation by the 100-year (one percent annual chance) flood event. This level of protection is commensurate with similar roads in the Dallas area and around the state and meets or exceeds NTTA and TxDOT standards for design of highway mainlane facilities. Approximately 297 acres of Alternative 3C would be located in the 100-year (base) floodplain. Approximately 418 acres of Alternative 4B would be located in the 100-year (base) floodplain.

Regarding Alternative 3C and 4B, the approach is to provide a hydraulically neutral design with respect to the Dallas Floodway function by balancing the Trinity Parkway embankments with corresponding excavations in the Dallas Floodway. As shown in **FEIS Section 4.14**, Alternatives 3C and 4B would meet the USACE criteria pertaining to valley storage and changes in floodwater velocities for both the 100-year flood and the SPF.

With regard to changes in flood elevation, the USACE criteria state there should be no rise in the 100-year or SPF elevation for the proposed condition (USACE, 1988). As shown in **SDEIS Section 4.13.4** (**SDEIS pages 4-137** and **4-138**) Alternative 3C would result in a maximum rise of 0.41 feet for the 100-year elevation and 0.03 feet for the SPF elevation. Alternative 4B would result in a maximum rise of 1.2 feet for the 100-year elevation and 0.71 feet for the SPF elevation, which would not meet the USACE criteria stating that there should be no rise in the flood elevation. These rises in 100-year and SPF elevations would be evaluated and fine-tuned during the detailed design phase if Alternative 3C or 4B is identified as the FHWA-recommended alternative. Specific measures or refinements to the preliminary design that would be expected to further reduce or eliminate the rises in flood elevations have not been identified at the current level of design development, but would be determined as part of final project design. The associated civil engineering work would be subject to review and approval by the USACE throughout design and construction to assure compliance with the requirement for hydraulic neutrality (and other design and functional requirements). However, if a modeled surface water elevation cannot be reduced to meet the 1988 ROD criteria, it would be necessary for a floodway alternative to receive variance authorization from the USACE Fort Worth District Commander before the project could be constructed. Alternatives 3C and 4B have been designed not to interfere with the USACE's or the city's ability to operate and maintain the Dallas Floodway, conduct flood fighting activities, or restore or improve the flood damage reduction capability of the federal project.

Future on-going maintenance within the Dallas Floodway is addressed in **SDEIS Section 2.4.8 (SDEIS page 2-63) and LSS Chapter 3 (LSS page 3-1)**. As described in **SDEIS Section 2.4.8**, mowing and other maintenance operations in the Trinity Parkway operations areas would be at least as frequent as the mowing and maintenance cycles of the City of Dallas Flood Control

District. Further, the city would be given unencumbered rights to operate within the Trinity Parkway project area, including the ability to shut the road down to traffic operations if judged necessary for purposes of the flood control function. Because of the hydraulically neutral design approach and the requirements for no interference with floodway operations and maintenance, neither Alternative 3C or 4B is expected to adversely impact human safety with respect to the Dallas Floodway's ability to carry floods.

Another issue related to human safety during floods is the possible danger to motorists of flooding over the proposed roadway. As described in **SDEIS Sections 2.4.6 through 2.4.9 (SDEIS pages 2-59 through 2-65)**, Alternatives 3C and 4B are proposed to be protected from inundation from the 100-year (one percent annual chance) storm, a level of protection commensurate with other roadways in the NTTA system. Alternatives 3C and 4B would be primarily protected by the physical elevation of the roadway above the computed 100-year event in the Dallas Floodway. Additionally, as described in **SDEIS Section 2.4.7 (SDEIS page 2-62),** the roadway would be protected by walls and pump stations at low points under existing bridges. In the event of a pump failure, the sags would fill with water after continual rainfall; however, this would be a gradually deepening condition and not a flash flood. In the event of a wall overtopping from the river levels (which would result in rapid inundation of the road), the Trinity Parkway would be closed well in advance of any anticipated overtopping under the directives of the Emergency Action Plan (see **SDEIS Appendix K-3** for additional details regarding the Emergency Action Plan). Because of the design features of the proposed road and emergency measures, safety to motorists during floods is not expected to be a differentiating feature between floodplain and non-floodplain alternatives. All proposed flood protection features are reflected in the estimated costs for Alternatives 3C and 4B.

Risks Associated with Implementation of the Action

The risks discussed in this section are distinct from flooding risks discussed in the previous section. Rather this section focuses on levee stability issues. As noted in **LSS Section 4.1.4.14 (LSS page 4-24)** for Alternative 2A and **LSS Section 4.1.5.14 (LSS page 4-47)** for Alternative 2B, this levee stability issues are not applicable to the non-floodplain alternatives. However, levee stability risks are an aspect of the Dallas Floodway that has been taken into consideration in the design development of Alternatives 3C and 4B. In this context, there is an inherent geotechnical "risk" of a levee failure, based on factors such as the physical layout of the levee, the materials and care used in its construction, the degree of maintenance, the underlying soil strata, and the consequences of overtopping.. This risk analysis for the levees should answer whether these conditions would be unchanged, worsened, or improved in segments where a Build Alternative comes in contact with a levee.

The geotechnical design conditions related to Alternatives 3C and 4B are discussed in **LSS Chapter 3 (LSS pages 3-1 through 3-12)**. Generally, the roadway design includes features at critical crossing and adjacency points to at least maintain the current strength and stability of the levees. The Trinity Parkway designs are also coordinated with the USACE conceptual designs for raising and thickening the levees so that the levee construction could occur before or after with no effect on constructability. Additionally, in areas where roadway embankments are adjacent, the roadway embankment would be designed to incorporate the levee widening up to at least the level of the top of the embankment.

Generally the geotechnical work in the Levee Remediation Plan (see **LSS Chapter 3**) helps to demonstrate that the city's plan will address all levee deficiencies cited by the *USACE Periodic Inspection Report*, and supports the conclusion that the Trinity Parkway embankment would do no harm to the adjacent levee segments. Moreover, an incremental benefit to levee stability is expected to occur in segments with adjacent roadway embankments. The benefit would accrue for several reasons: (i) for events up to the 100-year level, the flow path distance for seepage under the levee would be increased substantially due to the addition of the roadway embankment, resulting in lower seepage flows and more gradual transitions of pore pressure; (ii) due to the buttressing effect of the embankment (see **FEIS Figure 2-22** above) the effective height of the levee slope would be reduced, reducing the potential severity of surface slides, and (iii) in the worst case scenario of an overtopping of the levee, the roadway embankment and paving would likely act to stop any erosion failure of the levee structure, leaving a 100-year level embankment to hold back at least some of the floodwater from entering the city. The final point demonstrates the concept of "resilience" as a tool for mitigating the effects of natural and man-made disasters. The beneficial buttressing effect for the levees would be realized along the East Levee for Alternative 3C, and along both the East Levee and the West Levee for Alternative 4B.

Incompatible Development

The potential for induced development resulting from Trinity Parkway is presented in **SDEIS Section 4.24.1 (SDEIS page 4-205)**. The indirect impacts analysis is based on the presumption that any 100-year floodplain areas in the project area (including areas in the Dallas Floodway and the surrounding levee-protected lands) would be unavailable for development. Generally, the majority of the wetlands in the project area are within the Dallas Floodway and would unlikely be developed due to flood risk and regulation of development in floodplains, as well as the municipal ownership of the land.

The protection of the Dallas Floodway and the related sump areas from development would be expected to be stringent because of the regulatory interest in the federal flood protection project. In the Dallas Floodway, the city ownership generally extends at least to the landside levee toes on both sides of the Dallas Floodway, and the regulatory interest extends at least to the landside levee toes on both sides of the Dallas Floodway, and may extend further landside based on actual public ownership or other development constraints, including building setbacks to assure levee stability. In the sump areas, the city's land ownership extends at least from top of bank to top of bank. Accordingly, there would be no induced incompatible development in floodplains or wetlands in the Dallas Floodway or sump areas due to the implementation of Alternatives 2A, 2B, 3C or 4B.

Future development in the Dallas Floodway is expected to be controlled closely by the USACE and the City of Dallas as the Dallas Floodway owner. Such development may include lakes, parks, trails and similar recreational features as presented in the city's BVP if the proposed features are found to be technically sound and environmentally acceptable upon evaluation by the USACE. **SDEIS Section 3.1.1.4 (SDEIS page 3-11)** provides a description of the BVP and **SDEIS Plate 3-7** provides a master plan view of the proposal. Future floodplain development in the Dallas Floodway would be conducted in accordance with EO 11988 (Floodplain Management), as determined by the USACE. The proposed BVP improvements are intended to be flood resistant in response to the Dallas Floodway setting, and of the type (e.g., parks, lakes, trails) which are generally recognized as being appropriate and compatible in floodplains. In addition, the BVP improvements are not induced by the Trinity Parkway.

The obvious locational advantage for Alternative 2A is that it would avoid significant encroachment in the Dallas Floodway and would utilize existing transportation corridors. However, due to the density of development and transportation network in the area, this is also a disadvantage.

One of the objectives of the proposed project is to provide compatibility with local development plans. Alternatives 2A and 2B do not fully meet this project objective because they do not provide compatibility with local land use plans. The location of Alternative 2A is inconsistent with these plans and the city's vision of the Trinity River Corridor to be the "front door" to the Dallas CBD. The location of Alternatives 2A and 2B would restrict development in some areas of the corridor because of its influence on the size and depth of developable land remaining in the corridor. For instance, parts of the northern segment would have Stemmons Freeway (IH-35E) and the Trinity Parkway running in close proximity for some distance. The influence in the Mixmaster area would be more pronounced, with IH-35E/IH-30 and the Trinity Parkway located directly adjacent to each

other creating a highway corridor almost 1,000 feet wide for a distance of nearly 1 mile between the Dallas CBD and the East Levee. The Alternative 2B ROW would occupy nearly all available developable land between Riverfront Boulevard and the East Levee from Reunion Boulevard almost to Corinth Street, a distance in excess of 2 miles (see **FEIS Plate 2-3 B**). The location of Alternatives 3C and 4B (inside the floodplain) would not restrict development on the landside of the Dallas Floodway. Alternatives 3C and 4B would generally avoid disruption of the business district situated between the Dallas CBD and the East Levee, which would be consistent with the city's vision for this area. Alternative 3C is consistent with the City of Dallas land use planning to date, including the city's BVP for the Trinity River Corridor. However, the location of Alternative 4B along both the east and west levees within the Dallas Floodway is inconsistent with the city's BVP.

Another major aspect of incompatibility for Alternatives 2A and 2B occurs in the area south of the Dallas CBD at the connections to South RL Thornton Freeway (IH-35E) and the Houston-Jefferson couplet. As shown in **Table 2-6** of **FEIS Section 2.5.2**, Alternatives 2A would have only a half diamond connection to Houston-Jefferson Street and no direct connection to South RL Thornton Freeway. The lack of connectivity to South RL Thornton Freeway (IH-35E) would be a shortcoming, meaning that commuters on South RL Thornton Freeway could not connect to Trinity Parkway and bypass the downtown Mixmaster interchange. This lack of a connection would be particularly critical in the event of traffic incidents in the Mixmaster. Also shown in **Table 2-6** of **FEIS Section 2.5.2**, Alternative 2B would have no connections to Houston-Jefferson Street or South RL Thornton Freeway, resulting in the same connectivity issues outlined above for Alternative 2A.

Aesthetics

LSS Sections 4.1.4.16 (**LSS page 4-25**), **4.1.5.16** (**LSS page 4-48**), **4.1.6.16** (**LSS page 4-76**) and **4.1.5.16** (**LSS page 4-101**) each contain a detailed analysis of the visual impacts of Alternatives 2A, 2B, 3C, and 4B respectively. Considerable visual impacts resulting from Alternatives 2A and 2B would change the community setting in the areas along Irving/Riverfront Boulevard. Residents, business employees, business patrons, and motorists would experience strong visual changes due to the highly visible roadway that would obscure views and greatly alter the character of the neighborhoods, particularly the Design District.

Alternatives 2A and 2B require elevated loop ramps to connect to Woodall Rodgers Freeway. These ramps introduce possible visual impacts to the Margaret Hunt Hill (MHH) Bridge by limiting or blocking views of the bridge from certain vantage points. The issue of visual intrusion was one of the concerns for the proposed design during development of the city's BVP (City of Dallas,

2003a). The MHH Bridge was designed by internationally known architect Santiago Calatrava, and is generally perceived as a "signature" piece and possibly a tourist attraction. Alternatives 2A and 2B would have an effect on the viewshed to the MHH Bridge, which is not consistent with the city's BVP. Alternatives 3C and 4B would not restrict views of the MHH Bridge.

Within the Dallas Floodway, Alternatives 3C and 4B would be visible to recreational users between the levees; in some cases, the roadway and access ramps would be visible, while in other cases, the roadway would be hidden from view behind the Trinity Parkway's flood separation wall. The flood separation wall itself would be visible in some locations, but in most places, an earthen embankment would be built against the riverside face of the flood separation wall. In these locations, the combined flood separation wall/embankment would visually resemble the levees. The screening provided by the East Levee would restrict the Trinity Parkway's visibility from adjacent landside properties and buildings in the Dallas CBD. Alternatives 3C and 4B would not substantially limit the views of most commercial businesses and residential neighborhoods beyond the immediate corridor.

The most common view for future motorists from Alternative 3C would be of the East Levee and the flood separation wall along the western edge of the roadway. Similarly, the view from either side of the floodway for Alternative 4B would be a flood separation wall on one side and either the East Levee (northbound) or West Levee (southbound) on the other. The East Levee would limit the views from Alternatives 3C and 4B (northbound) toward many of the commercial businesses and residential neighborhoods on the other side of the levee and toward the Dallas CBD. However, it is expected that motorists would be able to see the skyline of the CBD from the southbound lanes of Alternative 4B on the west side of the floodway.

Historic Values

SDEIS Section 4.7.2.2 (page 4-87) provides an evaluation of potential impacts to cultural resources with historic significance. No significant adverse effects to archeological resources or non-archeological historic sites would occur due to any of the alternatives, except for an adverse effect to the Continental Viaduct by Alternative 3C. Alternative 3C mainlanes are proposed to go under the viaduct with ramp connections to the viaduct on top of and outside of the levee.

2.8.5 EO PRACTICABILITY ANALYSIS

This section is an alternative-by-alternative analysis of the information and predictive estimates of impacts presented in the foregoing section. For each of the Build Alternatives, each of the EO practicability factors is evaluated to determine whether the facts/estimates presented above

(based on the source material contained in the SDEIS/LSS) render the alternative practicable based on that factor alone. This is followed by a discussion addressing whether each alternative would be practicable if all of the EO practicability factors were considered in combination.

2.8.5.1 EO Practicability of Build Alternative 2A

2A: Project Cost

The practicability of Alternative 2A on the basis of cost was evaluated after first developing a cost screen from the combined construction costs and ROW/utilities relocation costs of comparable toll road projects constructed or planned in urban areas of Texas. Applying that cost screen to Alternative 2A indicates that its costs would be 88 percent greater per mainlane mile than the cost screen that was established at $20 million per mainlane mile. Accordingly, and allowing for the vagaries of estimating costs for major transportation projects, it is clear that the comparative cost of Alternative 2A is substantially greater than the costs normally associated with this type of project. In light of this information, Alternative 2A is not practicable based on project cost.

2A: Existing Technology

As Alternative 2A would utilize current engineering technology for roadway and related construction, there is no basis to expect any unusual or insurmountable technological issues that would affect constructability. Alternative 2A, therefore, is considered practicable with regard to existing technology.

2A: Logistics

Several logistical elements related to construction have been examined, as evidenced by the combined influence that these elements would have on the time necessary to construct Alternative 2A. Logistical elements affect the level of difficulty to complete construction, and therefore the time needed to complete construction as well as the level of inconvenience to the surrounding community such as road/lane closures and detours. The estimated length of time from startup of engineering/construction activities until the Trinity Parkway could be fully open to traffic is estimated to be 10 years for Alternative 2A. This lengthy time-to-construct is attributable to the need to acquire the ROW and displace buildings on approximately 285 properties, which would involve substantial demolition activity and associated hazardous material abatement. Additional time would be required to address site contamination on 34 high-risk hazardous materials sites and the relocation of overhead and subsurface utilities that saturate a highly-urbanized corridor. A most important aspect affecting the logistics of construction, thereby adding to the length of time to construct, would be the difficulties of constructing a roadway along a busy commercial roadway corridor, and the unavoidable inconvenience that would be caused from the

many and changing road and lane closures and the detours that would be required. A 10-year construction period for Alternative 2A would not preclude further consideration of this alternative as it would be "capable of being done" according to the definition of practicable in 23 CFR Section 650.105(k).

2A: Natural and Beneficial Values Served by Floodplains

Alternative 2A would have a floodplain encroachment footprint of 55 acres, and would result in 20.7 acres of impacts to undeveloped areas, including impacts to the following habitats: riparian forest, 4.6 acres; waters of the U.S., including wetlands, 4.2 acres; and maintained non-native grassland, 11.9 acres. These and other anticipated impacts on natural and beneficial floodplain values would not prevent Alternative 2A from being considered practicable, particularly in light of potential compensatory mitigation that may be employed to address these and other impacts.

2A: Waters of the U.S., including Wetlands, and Water Quality

Alternative 2A would adversely affect 4.2 acres of waters of the U.S., including wetlands, as the result of fill from the construction of road surfaces and bridges. These impacts would affect approximately 1.4 acres of forested wetlands, 2.7 acres of the old Trinity River channel, and 0.1 acre of intermittent stream channel. These expected impacts, which reflect a combination of temporary and permanent impacts, would be subject to the conditions and mitigation requirements of an individual permit under Section 404. Similarly, potential construction-related erosion from construction sites would be subject to the requirement of a SWPPP and the employment of appropriate BMPs to minimize migration of eroded soil offsite into surface waters. Considering the level of impacts to aquatic features and water quality, the regulatory requirements designed to minimize and mitigate for impacts, and the functions, values, and quality of aquatic resources that would be affected, the proposed Alternative 2A would be a practicable alternative with respect to this evaluation factor.

2A: Fish and Wildlife Habitat Values

The level of impact of Alternative 2A on wildlife was assessed primarily in terms of anticipated impacts to high quality habitat such as riparian forests and some aquatic habitats, as summarized above for habitat-related factors. The construction of Alternative 2A would result in limited habitat fragmentation from the clearing of riparian forest areas near the southern end of the project alignment. Mitigation for impacts to riparian forest and aquatic habitats would include efforts to avoid and minimize impacts and mitigate for long-term compensation of habitat impacts. This alternative is not expected to result in an adverse effect/impact to any federally- or state-listed threatened or endangered species, or state species of concern. Accordingly, Alternative 2A is considered a practicable alternative with respect to this evaluation factor.

2A: Conservation

Energy, fuel, and materials consumption would occur during construction and operation of Alternative 2A. As this alternative would operate as an all-electronic toll collection facility, which provides operational efficiencies to reduce stop and go traffic conditions, lower fuel/energy consumption is expected. In addition, the highway construction materials that would be expended are not in short supply and therein would not adversely affect continued availability of similar resources. Alternative 2A is therefore considered a practicable alternative with respect to this evaluation factor.

2A: Needs and Welfare of the Community

Alternative 2A would result in significant economic impacts to the business community in the Design District, the TOD District, as well other areas within the community. The direct economic effects would result in an estimated displacement of 285 to 304 businesses and loss of over 6,000 jobs. Although the city would benefit economically from construction-related spending, such benefits would not adequately offset impacts to local businesses, many of which have invested in development/redevelopment in response to city TIF district and other incentives.

Acceptance of Alternative 2A by the City of Dallas officials and community is highly unlikely because it would be contrary to the citywide bond approval from May 2, 1998 in which Dallas residents supported a Trinity Parkway location within the Dallas Floodway. Alternative 2A would also be inconsistent with a citywide special election held on November 6, 2007, which determined that the city should continue to consider alternatives in the Dallas Floodway for the Trinity Parkway. The City of Dallas would not support the construction of Alternative 2A as doing so would require implementing a completely new urban planning strategy in contravention of foundational city plans and policies, as well as promises made to the private sector. Alternative 2A is generally incompatible with local development plans and is inconsistent with the BVP.

Alternative 2A would be contrary to long-standing urban planning by the City of Dallas to revitalize areas characterized by aging industrial areas into vibrant urban centers. For over two decades the city has sought to attract businesses and real estate developers to areas such as the Design District as part of its long term plans. The city has created TIF districts for the Design District and the TOD district, thereby foregoing tax revenues in the short term as a means of attracting investors to these areas to achieve the city's and community's vision of a pedestrian-friendly mixed use urban environment. Constructing a tollway in place of Irving/Riverfront Boulevard would greatly magnify an existing barrier within the Design District and the TOD District, thereby upsetting city plans for the area. Lastly, there has been a longstanding intent in Dallas to include

a major roadway in the Dallas Floodway, most notably derived from the Stemmons Deed Precedent.

A tollway along the Alternative 2A alignment would obstruct collective city/community planning efforts to transform existing industrial areas into thriving urban environments planned to enhance community cohesion and foster further development of undeveloped land and redevelopment of aging properties. For instance, this alternative would occupy nearly all available developable land between Riverfront Boulevard and the East Levee from Reunion Boulevard almost to Corinth Street, a distance in excess of 2 miles. The road barrier would hinder the success of the business community by becoming a disincentive for future investment while causing economic harm to existing investments. This is a particular concern to merchants within the Design District, based on statements made during public comment periods for the DEIS, SDEIS, and LSS, as it would stifle the existing pattern of influx of developers, retailers, and shoppers to the Design District's restaurants, retail stores, art galleries, and apartment complexes.

As articulated by numerous members of the affected business community in comments received from the DEIS, SDEIS, and LSS, Alternative 2A is generally passionately opposed by the Dallas business community and others as being contrary to the needs and welfare of the people in project area communities. Key issues cited by the public as adverse impacts of Alternative 2A includes the following: a high number of displacements and relocations, disruption of established businesses along Irving/Riverfront Boulevard, adverse impacts to community resources, and increased traffic on adjacent streets. Statements submitted by members of the community during public comment periods expressed concern that Alternative 2A would have "destructive impacts" to the established businesses and residential communities in the area. City of Dallas Council members and the Mayor have submitted public comments opposing Alternative 2A, and business associations, which represent hundreds of local businesses also submitted comments in opposition to Alternative 2A.

The incompatibility of Alternative 2A with city plans and programs, widespread objections to it by merchants, developers, and residents, and the significant adverse effects to investments in recent years to revitalize aging urban areas, make it clear that there is a lack of community support for this alternative. Moreover, the strong opposition to this alternative by both public officials as well as community members strongly indicates that constructing Alternative 2A would require a wholesale setting aside of public sentiment against it. These and other impacts on the needs and welfare of the community indicate that Alternative 2A is virtually "not capable of being done" in Dallas, and is therefore not practicable with regard to this evaluation factor.

2A: Economic Impacts

Displacements within the Design District due to Alternative 2A would have a significant negative impact on economic aspects of this area both immediately and over the long-term. This would be due to the acquisition of existing buildings, primarily active commercial and industrial businesses, and conversion of this land to transportation use that is essential to the long-term vision and economic vitality of the Design District as well as the TOD District farther east. Alternative 2A is estimated to lead to the displacement of 285 to 304 businesses and 6,437 to 6,640 jobs, making it incompatible with ongoing economic investments of the City of Dallas and the business community in the Design and TOD Districts. Many of these jobs and businesses could be permanently lost if displaced businesses cannot relocate within the same geographic area or decide for other reasons to cease operations and employees are unable to find similar work. The construction of Alternative 2A would also impact the remaining commercial buildings adjacent to the roadway. The impacts would primarily involve access and traffic circulation challenges over the construction period, which would affect business activity throughout the corridor (see **SDEIS Section 4.20.1**). The conversion of business properties to ROW would remove an estimated $379 million from the City of Dallas tax base and annual tax revenue for the combined taxing entities (Dallas County, City of Dallas, and DISD), and the annual combined loss of revenue for these three taxing entities would be an estimated $10.3 million. Although the overall direct and indirect economic impacts to the Dallas CBD of Alternative 2A are expected to be significant and adverse, this alternative is still considered practicable as to this factor. This is in part because the compensation required by the Uniform Relocation Assistance and Real Property Acquisition Policies Act would partially mitigate economic losses to property owners.

2A: Air Quality Impacts

Although the USEPA-designated ten-county DFW area is in non-attainment for ozone, regional planners are pursuing congestion management measures to reduce levels of ozone. Local concentrations of carbon monoxide are not expected to exceed federal standards at any time, and daily MSAT emissions are expected to substantially decrease due in large part to the implementation of USEPA's motor vehicle emission control standards. Consequently, no adverse air quality impacts are anticipated from Alternative 2A, which indicates that it is a practicable alternative in terms of air quality.

2A: Traffic Noise Impacts

The construction of Alternative 2A would result in traffic noise impacts to 208 noise receivers and one park. Mitigation for impacts to noise receivers would include efforts to avoid and minimize traffic noise impacts. Accordingly, Alternative 2A is considered a practicable alternative with respect to this evaluation factor.

2A: Impact of Floods on Human Safety

Alternative 2A would be located within the levee-protected area on the landside of the Dallas Floodway East Levee and the proposed Lamar Levee, except for elevated bridge crossings in the southern segment that would be designed to avoid increases in flood elevations and loss of valley storage. Therefore, Alternative 2A (see **LSS Section 4.1.4.13, LSS page 4-24**) meets the 1988 ROD hydrologic and hydraulic criteria and is considered a practicable alternative with respect to this evaluation factor.

2A: Risks Associated with Implementation of the Action

The risks associated with this section focus on levee stability issues. As Alternative 2A is not located within the Dallas Floodway, levee stability issues are not applicable and Alternative 2A is practicable as to this factor.

2A: Incompatible Development

Generally, the majority of the wetlands in the project area are within the Dallas Floodway and would unlikely be developed due to flood risk and regulation of development in floodplains, as well as the municipal ownership of the land. The protection of the Dallas Floodway and the related sump areas from development is also expected to be stringent because of the regulatory interest in the federal flood protection project. Accordingly, there would be no induced incompatible development in floodplains or wetlands in the Dallas Floodway or sump areas due to the implementation of Alternative 2A.

Future development in the Dallas Floodway is expected to be controlled closely by the USACE and the City of Dallas as the Dallas Floodway owner. Proposed BVP improvements are intended to be flood resistant in keeping with the Dallas Floodway setting, and are of the type (e.g., parks, lakes, trails) which are generally recognized as being appropriate and compatible in floodplains.

The obvious locational advantage for Alternative 2A is that it would avoid significant encroachment in the Dallas Floodway and would utilize existing transportation corridors. However, due to the density of development and transportation network in the area along Irving/Riverfront Boulevard, this is also a disadvantage.

One of the objectives of the proposed project is to provide compatibility with local development plans. Alternative 2A does not fully meet this objective because it does not provide compatibility with local land use plans. The location of Alternative 2A is inconsistent with these plans and the city's vision of the Trinity River Corridor to be the "front door" to the Dallas CBD. The location of

Alternative 2A would restrict development in some areas of the corridor because of its influence on the size and depth of developable land remaining in the corridor. For instance, parts of the northern segment would have Stemmons Freeway (IH-35E) and the Trinity Parkway running in close proximity for some distance. The influence in the Mixmaster area would be more pronounced with IH-35E/IH-30 and the Alternative 2A located directly adjacent to each other creating a highway corridor almost 1,000 feet wide for a distance of nearly 1 mile between the Dallas CBD and the East Levee.

Another major aspect of incompatibility for Alternative 2A occurs in the area south of the Dallas CBD at the connections to South RL Thornton Freeway (IH-35E) and the Houston-Jefferson couplet. As shown in **Table 2-6** of **FEIS Section 2.5.2**, Alternative 2A would have only a half diamond connection to Houston-Jefferson Street and no direct connection to South RL Thornton Freeway. The lack of connectivity to South RL Thornton Freeway (IH-35E) would be a shortcoming, meaning that commuters on South RL Thornton Freeway could not connect to Trinity Parkway and bypass the downtown Mixmaster interchange. This lack of a connection would be particularly critical in the event of traffic incidents in the Mixmaster. Although Alternative 2A would not provide compatibility with local development plans, this alternative would still be considered practicable as to this factor. Given sufficient municipal and community support for this alternative, it could be possible for city plans to be adapted to be consistent with the alternative. Accordingly, the practicability of this alternative is not precluded due to incompatibility with local plans, although this fact will be considered further as practicability is determined based on all EO practicability factors.

2A: Aesthetics

The issue of visual intrusion was one of the concerns for the proposed design during development of the city's BVP (City of Dallas, 2003a). As it approaches downtown Dallas, Alternative 2A elevates to more than 50 feet above grade to clear Woodall Rodgers Freeway, and to more than 75 feet above grade to clear Houston-Jefferson and South RL Thornton Freeway (IH-35E). Considerable visual impacts resulting from Alternative 2A would change the community setting in the areas along Irving/Riverfront Boulevard. Residents, business employees, business patrons, and motorists would experience strong visual changes due to the highly visible roadway that would obscure views and greatly alter the character of the neighborhoods, particularly the Design District.

Alternative 2A also requires elevated loop ramps to connect to Woodall Rodgers Freeway. These ramps introduce possible visual impacts to the MHH Bridge by limiting or blocking views of the bridge from certain vantage points, which is not consistent with the city's BVP. The MHH Bridge

is generally perceived as a "signature" piece and a possible tourist attraction. Although Alternative 2A would negatively affect the viewshed to the MHH Bridge, this impact and other adverse aesthetic impacts would not be sufficient to preclude Alternative 2A from being considered practicable as to this factor.

2A: Historic Values

No significant adverse effects to archeological resources or non-archeological historic sites would occur due to Alternative 2A. Accordingly, Alternative 2A is considered a practicable alternative with respect to this evaluation factor.

2A: EO Practicability Based on All Factors Combined

Alternative 2A could not be built within existing natural, social, and economic constraints applicable to the project area and is, therefore, not a practicable alternative. This finding is based primarily to the excessive cost of this alternative as compared to other comparable toll projects. Equally compelling is the incompatibility of Alternative 2A with the needs and welfare of the community, which goes far beyond inconsistency with city plans and programs. The incompatibility of Alternative 2A with local plans does not require a finding of practicability, because such plans could be modified to adapt to the alternative. However, such plans are a reflection of the needs of the community as reflected in a complex process involving the election of city council, professional staff sometimes aided by the input of consultants with specialized expertise. Feedback from the city and the community have made it clear that there is not only a lack of support for this alternative, but strong opposition to it from various elements within the community. The level of harm associated with this alternative to the community, and the destructive influence it would have on the nationally recognized Design District and other community elements weigh heavily against its practicability. The level of economic impacts and harm to community cohesion would not likely be amenable to effective mitigation in light of City of Dallas plans, policies, and investments. Finally, substantial adverse impacts to Dallas CBD economics and aesthetics further contribute to the undesirability of this alternative as a viable means to meet the need and purpose of the Trinity Parkway. For the foregoing reasons, Alternative 2A is not a practicable alternative under the policies set out in EO 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), and implementing regulations.

2.8.5.2 EO Practicability of Build Alternative 2B

2B: Project Cost

The practicability of Alternative 2B on the basis of cost was evaluated after first developing a cost screen from the combined construction costs and ROW/utilities relocation costs of comparable

toll road projects constructed or planned in urban areas of Texas. Applying that cost screen to Alternative 2B indicates that its costs would be 50 percent greater per mainlane mile than the cost screen that was established at $20 million per mainlane mile. Accordingly, and allowing for the vagaries of estimating costs for major transportation projects, it is clear that the comparative cost of Alternative 2B is substantially greater than the costs normally associated with this type of project. In light of this information, Alternative 2B is not practicable based on project cost.

2B: Existing Technology

As Alternative 2B would utilize current engineering technology for roadway and related construction, there is no basis to expect any unusual or insurmountable technological issues that would affect constructability. Alternative 2B, therefore, is considered practicable with regard to existing technology.

2B: Logistics

Several logistical elements related to construction have been examined, as evidenced by the combined influence these elements would have on the time necessary to construct Alternative 2B. Logistical elements affect the level of difficulty to complete construction, and therefore the time needed to complete construction as well as the level of inconvenience to the surrounding community such as road/lane closures and detours. The estimated length of time from startup of engineering/construction activities until the Trinity Parkway could be fully open to traffic is estimated to be nine years for Alternative 2B. This lengthy time-to-construct is attributable to the need to acquire the ROW and displace buildings on approximately 245 properties, which would involve substantial demolition activity and associated hazardous material abatement. Additional time would be required to address site contamination on 35 high-risk hazardous materials sites and the relocation of overhead and subsurface utilities that saturate a highly-urbanized corridor. A most important aspect affecting the logistics of construction, thereby adding to the length of time to construct, would be the difficulties of constructing a roadway along a busy commercial roadway corridor, and the unavoidable inconvenience that would be caused from the many road and lane closures and the detours that would be required. A 9-year construction period for Alternative 2B would not preclude further consideration of this alternative as it would be “capable of being done” according to the definition of practicable in 23 CFR Section 650.105(k).

2B: Natural and Beneficial Values Served by Floodplains

Alternative 2B would have a floodplain encroachment footprint of 76 acres, and would result in 46.6 acres of impacts to undeveloped areas, including impacts to the following habitats: riparian forest, 6.4 acres; waters of the U.S., including wetlands, 9.1 acres; and maintained non-native grassland, 31.1 acres. These and other anticipated impacts on natural and beneficial floodplain

values would not prevent Alternative 2B from being considered practicable, particularly in light of potential compensatory mitigation that may be employed to address these impacts.

2B: Waters of the U.S., including Wetlands, and Water Quality

Alternative 2B would adversely affect 9.1 acres of waters of the U.S., including wetlands, as the result of fill from the construction of road surfaces and bridges. These impacts would affect approximately 2.5 acres of forested wetlands, 6.3 acres of the old Trinity River channel, and 0.2 acre of intermittent stream channel. These expected impacts, which reflect a combination of temporary and permanent impacts, would be subject to the conditions and mitigation requirements of an individual permit under Section 404. Similarly, potential construction-related erosion from construction sites would be subject to the requirement of a SWPPP and the employment of appropriate BMPs to minimize migration of eroded soil offsite into surface waters. Considering the level of impacts to aquatic features and water quality, the regulatory requirements designed to minimize and mitigate for impacts, and the functions, values, and quality of aquatic resources that would be affected, the proposed Alternative 2B would be a practicable alternative with respect to this evaluation factor.

2B: Fish and Wildlife Habitat Values

The level of impact of Alternative 2B on wildlife was assessed primarily in terms of anticipated impacts to high quality habitat such as riparian forests and some aquatic habitats, as summarized above for habitat-related factors. The construction of Alternative 2B would result in limited habitat fragmentation from the clearing of riparian forest areas near the southern end of the project alignment. Mitigation for impacts to riparian forest and aquatic habitats would include efforts to avoid and minimize impacts as well mitigate for long-term compensation of habitat impacts. This alternative is not expected to result in an adverse effect/impact to any federally- or state-listed threatened or endangered species, or state species of concern. Accordingly, Alternative 2B is considered a practicable alternative with respect to this evaluation factor.

2B: Conservation

Energy, fuel, and materials consumption would occur during construction and operation of Alternative 2B. As this alternative would operate as an all-electronic toll collection facility, which provides operational efficiencies to reduce stop and go traffic conditions, lower fuel/energy consumption is expected. In addition, the highway construction materials that would be expended are not in short supply and therein would not adversely affect continued availability of similar resources. Alternative 2B, therefore, is considered a practicable alternative with respect to this evaluation factor.

2B: Needs and Welfare of the Community

Alternative 2B would result in overwhelming economic impacts to the business community in the Design District, the TOD District, as well other areas within the community. The direct economic effects would result in an estimated displacement of 220 to 289 businesses and loss of over 6,000 jobs. Although the city would benefit economically from construction-related spending, such benefits would not adequately offset impacts to local businesses, many of which have invested in development/redevelopment in response to city TIF district and other incentives.

Acceptance of Alternative 2B by the City of Dallas officials and community is highly unlikely because it would be contrary to the citywide bond approval from May 2, 1998 in which Dallas residents supported a Trinity Parkway location within the Dallas Floodway. Alternative 2B would also be inconsistent with a citywide special election held on November 6, 2007, which determined that the city should continue to consider alternatives in the Dallas Floodway for the Trinity Parkway. The City of Dallas would not support the construction of Alternative 2B as doing so would require implementing a completely new urban planning strategy in contravention of foundational city plans and policies, as well as promises made to the private sector. Alternative 2B is generally incompatible with local development plans and is inconsistent with the BVP.

Alternative 2B would be contrary to long-standing urban planning by the City of Dallas to revitalize areas characterized by aging industrial areas into vibrant urban centers. For over two decades the city has sought to attract businesses and real estate developers to areas such as the Design District as part of its long term plans. The city has created TIF districts for the Design District and the TOD district, thereby foregoing tax revenues in the short term as a means of attracting investors to these areas to achieve the city's and community's vision of a pedestrian-friendly mixed use urban environment. Constructing a tollway in place of Irving/Riverfront Boulevard would greatly magnify an existing barrier within the Design District and the TOD District, thereby upsetting city plans for the area. Lastly, there has been a longstanding intent in Dallas to include a major roadway in the Dallas Floodway, most notably derived from the Stemmons Deed Precedent.

A tollway along the Alternative 2B alignment would obstruct collective city/community planning efforts to transform existing industrial areas into thriving urban environments planned to enhance community cohesion and foster further development of undeveloped land and redevelopment of aging properties. For instance, this alternative would occupy nearly all available developable land between Riverfront Boulevard and the East Levee from Reunion Boulevard almost to Corinth Street, a distance in excess of 2 miles. The road barrier would hinder the success of the business community by becoming a disincentive for future investment while causing economic

harm to existing investments. This is a particular concern to merchants within the Design District, based on statements made during public comment periods for the DEIS, SDEIS, and LSS, as it would stifle the existing pattern of influx of developers, retailers, and shoppers to the Design District's restaurants, retail stores, art galleries, and apartment complexes.

As articulated by numerous members of the affected business community in comments received from the DEIS, SDEIS, and LSS, Alternative 2B is generally passionately opposed by the Dallas business community and others as being contrary to the needs and welfare of the people in project area communities. Key issues cited by the public as adverse impacts of Alternative 2B includes the following: a high number of displacements and relocations, disruption of established businesses along Irving/Riverfront Boulevard, adverse impacts to community resources, and increased traffic on adjacent streets. Statements submitted by members of the community during public comment periods expressed concern that Alternative 2B would have "destructive impacts" to the established businesses and residential communities in the area. City of Dallas Council members and the Mayor have submitted public comments opposing Alternative 2B, and business associations, which represent hundreds of local businesses, also submitted comments in opposition to Alternative 2B.

The incompatibility of Alternative 2B with city plans and programs, widespread objections to it by merchants, developers, and residents, and the significant adverse effects to investments in recent years to revitalize aging urban areas, make it clear that there is a lack of community support for this alternative. Moreover, the strong opposition to this alternative by both public officials as well as community members strongly indicates that constructing Alternative 2B would require a wholesale setting aside of public sentiment against it. These and other impacts on the needs and welfare of the community indicate that Alternative 2B is virtually "not capable of being done" in Dallas, and is therefore not practicable with regard to this evaluation factor.

2B: Economic Impacts

Displacements within the Design District due to Alternative 2B would have a significant negative impact on economic aspects of this area both immediately and over the long-term. This would be due to the acquisition of existing buildings, primarily active commercial and industrial businesses, and conversion of this land to transportation use that is essential to the long-term vision and economic vitality of the Design District as well as the TOD farther east. Alternative 2B is estimated to lead to the displacement of 220 to 289 businesses and 6,182 to 6,655 jobs, making it incompatible with ongoing economic investments of the City of Dallas and the business community in the Design District and the TOD District. Many of these jobs and businesses could be permanently lost if displaced businesses cannot relocate within the same geographic area, or

decide for other reasons to cease operations and employees are unable to find similar work. The construction of Alternative 2B would also impact the remaining commercial buildings adjacent to the roadway. The impacts would primarily involve access and traffic circulation challenges over the construction period, which would affect business activity throughout the corridor (see **SDEIS Section 4.20.1**). The conversion of business properties to ROW would remove an estimated $306 million from the City of Dallas tax base and annual tax revenue for the combined taxing entities (Dallas County, City of Dallas, and DISD), and the annual combined loss of revenue for these three taxing entities would be an estimated $8.3 million. Although the overall direct and indirect economic impacts to the Dallas CBD of Alternative 2B are expected to be significant and adverse, this alternative is still considered practicable as to this factor. This is in part because the compensation required by the Uniform Relocation Assistance and Real Property Acquisition Policies Act would partially mitigate economic losses to property owners.

2B: Air Quality Impacts

Although the USEPA-designated ten-county DFW area is in non-attainment for ozone, regional planners are pursuing congestion management measures to reduce levels of ozone. Local concentrations of carbon monoxide are not expected to exceed federal standards at any time, and daily MSAT emissions are expected to substantially decrease due in large part to the implementation of USEPA's motor vehicle emission control standards. Consequently, no substantial adverse air quality impacts are anticipated from Alternative 2B, which indicates that it is a practicable alternative in terms of air quality.

2B: Traffic Noise Impacts

The construction of Alternative 2B would result in traffic noise impacts to 201 noise receivers and one park. Mitigation for impacts to noise receivers would include efforts to avoid and minimize traffic noise impacts. Accordingly, Alternative 2B is considered a practicable alternative with respect to this evaluation factor.

2B: Impact of Floods on Human Safety

Alternative 2B would be located within the levee-protected area on the landside of the Dallas Floodway East Levee and the proposed Lamar Levee, except for elevated bridge crossings in the southern segment that would be designed to avoid increases in flood elevations and loss of valley storage. Therefore, Alternative 2B (see **LSS Section 4.1.5.13, LSS page 4-47**) meets the 1988 ROD hydrologic and hydraulic criteria and is considered a practicable alternative with respect to this evaluation factor.

2B: Risks Associated with Implementation of the Action

The risks associated with this section focus on levee stability issues. As Alternative 2B is not located within the Dallas Floodway, levee stability issues are not applicable and Alternative 2B is practicable as to this factor.

2B: Incompatible Development

Generally, the majority of the wetlands in the project area are within the Dallas Floodway and would unlikely be developed due to flood risk and regulation of development in floodplains, as well as the municipal ownership of the land. The protection of the Dallas Floodway and the related sump areas from development is also expected to be stringent because of the regulatory interest in the federal flood protection project. Accordingly, there would be no induced incompatible development in floodplains or wetlands in the Dallas Floodway or sump areas due to the implementation of Alternative 2B.

Future development in the Dallas Floodway is expected to be controlled closely by the USACE and the City of Dallas as the Dallas Floodway owner. Proposed BVP improvements are intended to be flood resistant in keeping with the Dallas Floodway setting, and are of the type (e.g. parks, lakes, trails) which are generally recognized as being appropriate and compatible in floodplains.

One of the objectives of the proposed project is to provide compatibility with local development plans. Alternative 2B does not fully meet this objective because the location of Alternative 2B would restrict development in some areas of the corridor due to its influence on the size and depth of developable land remaining in the corridor. For instance, parts of the northern segment would have Stemmons Freeway (IH-35E) and the Trinity Parkway running in close proximity for some distance. The influence in the Mixmaster area would be more pronounced, with IH-35E/IH-30 and the Trinity Parkway located directly adjacent to each other creating a highway corridor almost 1,000 feet wide for a distance of nearly 1 mile between the Dallas CBD and the East Levee. Alternative 2B ROW would also occupy nearly all available developable land between Riverfront Boulevard and the East Levee from Reunion Boulevard almost to Corinth Street, a distance in excess of 2 miles (see **FEIS Plate 2-3 B**).

Another major aspect of incompatibility for Alternative 2B occurs in the area south of the Dallas CBD at the connections to South RL Thornton Freeway (IH-35E) and the Houston-Jefferson couplet. As shown in **Table 2-6** of **FEIS Section 2.5.2**, Alternative 2B would have no connections to Houston-Jefferson Street or South RL Thornton Freeway. The lack of connectivity to South RL Thornton Freeway (IH-35E) would be a shortcoming, meaning that commuters on South RL Thornton Freeway could not connect to Trinity Parkway and bypass the downtown Mixmaster

interchange. This lack of a connection would be particularly critical in the event of traffic incidents in the Mixmaster. Although Alternative 2B would not provide compatibility with local development plans, this alternative would still be considered practicable as to this factor. Given sufficient municipal and community support for this alternative, it could be possible for city plans to be adapted to be consistent with the alternative. Accordingly, the practicability of this alternative is not precluded due to incompatibility with local plans, although this fact will be considered further as practicability is determined based on all EO practicability factors.

2B: Aesthetics

The issue of visual intrusion was one of the concerns for the proposed design during development of the city's BVP (City of Dallas, 2003a). As it approaches downtown Dallas, Alternative 2B elevates to more than 50 feet above grade to clear Woodall Rodgers Freeway. The Alternative 2B mainlanes in the vicinity of downtown Dallas may affect the visual character around the northwestern corner of the CBD. In this area, Alternative 2B would not promote visibility from the new road to the proposed Trinity River Floodway Park, which is important to the City of Dallas. Considerable visual impacts resulting from Alternative 2B would change the community setting in the areas along Irving/Riverfront Boulevard. Residents, business employees, business patrons, and motorists would experience strong visual changes due to the highly visible roadway that would obscure views and greatly alter the character of the neighborhoods, particularly the Design District.

Alternative 2B also requires elevated loop ramps to connect to Woodall Rodgers Freeway. These ramps introduce possible visual impacts to the MHH Bridge by limiting or blocking views of the bridge from certain vantage points, which is not consistent with the city's BVP. The MHH Bridge is generally perceived as a "signature" piece and a possible tourist attraction. Although Alternative 2B would negatively affect the viewshed to the MHH Bridge, this impact and other adverse aesthetic impacts would not be sufficient to preclude Alternative 2B from being considered practicable as to this factor.

2B: Historic Values

No significant adverse effects to archeological resources or non-archeological historic sites would occur due to Alternative 2B. Accordingly, Alternative 2B is considered a practicable alternative with respect to this evaluation factor.

2B: EO Practicability Based on All Factors Combined

Alternative 2B could not be built within existing natural, social, and economic constraints applicable to the project area and is, therefore, not a practicable alternative. This finding is based

primarily to the excessive cost of this alternative as compared to other comparable toll projects. Equally compelling is the incompatibility of Alternative 2B with the needs and welfare of the community, which goes far beyond inconsistency with city plans and programs. The incompatibility of Alternative 2B with local plans does not require a finding of practicability, because such plans could be modified to adapt to the alternative. However, such plans are a reflection of the needs of the community as reflected in a complex process involving the election of city council, professional staff sometimes aided by the input of consultants with specialized expertise. Feedback from the city and the community have made it clear that there is not only a lack of support for this alternative, but strong opposition to it from various elements within the community. The level of harm associated with this alternative to the community, and the destructive influence it would have on the nationally recognized Design District and other community elements weigh heavily against its practicability. The level of economic impacts and harm to community cohesion would not likely be amenable to effective mitigation in light of City of Dallas plans, policies, and investments. Finally, substantial adverse impacts to Dallas CBD economics and aesthetics further contribute to the undesirability of this alternative as a viable means to meet the need and purpose of the Trinity Parkway. For the foregoing reasons, Alternative 2B is not a practicable alternative under the policies set out in EO 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), and implementing regulations.

2.8.5.3 EO Practicability of Build Alternative 3C

3C: Project Cost

The practicability of Alternative 3C on the basis of cost was evaluated after first developing a cost screen from the combined construction costs and ROW/utilities relocation costs of comparable toll road projects constructed or planned in urban areas of Texas. Applying that cost screen to Alternative 3C indicates that its costs would be 10 percent greater per mainlane mile than the cost screen that was established at $20 million per mainlane mile. Accordingly, and allowing for the vagaries of estimating costs for major transportation projects, it appears that Build Alternative 3C is reasonably within range of the cost screen based on the costs normally associated with this type of project. In light of this information, Alternative 3C is practicable based on project cost.

3C: Existing Technology

As Alternative 3C would utilize current engineering technology for roadway and related construction, there is no basis to expect any unusual or insurmountable technological issues that would affect constructability. Alternative 3C, therefore, is considered practicable with regard to existing technology.

3C: Logistics

Several logistical elements related to construction have been examined, as evidenced by the combined influence that these elements would have on the time necessary to construct Alternative 3C. Logistical elements affect the level of difficulty to complete construction, and therefore the time needed to complete construction as well as the level of inconvenience to the surrounding community such as road/lane closures and detours. The estimated length of time from startup of engineering/construction activities until the Trinity Parkway could be fully open to traffic is estimated to be approximately 6 years for Alternative 3C. This lengthy time-to-construct is attributable to the need to acquire the ROW and displace buildings on approximately 35 properties, which would involve demolition activity and associated hazardous material abatement. Additional time would be required to address site contamination on 17 high-risk hazardous materials sites and the relocation of overhead and subsurface utilities found particularly within the northern and southern ends of the proposed project. Also, construction of those portions of this alternative occurring outside the Dallas Floodway would be within a busy urban area, and would unavoidably result in many and changing road and lane closures and the detours that would be required. Construction of Alternative 3C primarily within the Dallas Floodway would isolate much of the construction activity from the surrounding urban areas, thereby minimizing some logistical challenges. A 6-year construction period for Alternative 3C would not preclude further consideration of this alternative as it would be "capable of being done" according to the definition of practicable in 23 CFR Section 650.105(k).

3C: Natural and Beneficial Values Served by Floodplains

The significant and longitudinal encroachments of Alternative 3C (and its predecessors) have been the subject of great scrutiny since the outset of the Trinity Parkway development process. The SDEIS and LSS provide detailed hydrologic, hydraulic, and other engineering analyses and design focused on addressing the potential risks associated with construction of a roadway within the particular floodplain environment of the Dallas Floodway, several aspects of which are highlighted here. The ROW footprint for Alternative 3C would have a floodplain encroachment footprint of 297 acres, and would disturb an additional 335.6 acres of floodplain areas for the excavation of material needed to construct roadway embankment and for other construction purposes. The combined effects of these aspects of construction would result in 592.3 acres of impacts to undeveloped areas within the Trinity River floodplain, including impacts to the following habitats: riparian forest, 33.3 acres; waters of the U.S., including wetlands, 90.9 acres; and maintained non-native grassland, 468.1 acres. All of the expected impacts to excavation areas would be temporary, as would approximately half of the impacts to areas within the roadway ROW footprint, and these areas would be revegetated with native grasses. All impacts to forested areas would be permanent, and these areas along with other areas of high quality

habitat would be addressed with compensatory mitigation. As evaluated in the SDEIS and LSS, Alternative 3C would adversely affect floodplain values related to wildlife movement, open space loss, and outdoor recreation potential due to the construction, operation, and maintenance of the new ROW. However, consideration has also been given to the history of human alteration of these same floodplain values as a result of the creation of the Dallas Floodway, the predominance of non-native grasslands throughout non-forested floodplain areas, and the active regimen of mowing and other operations and maintenance activities related to levees and the floodplain floor. As discussed in **FEIS Section 2.8.4.2**, the areal and longitudinal encroachments of this alternative within the Dallas Floodway would not substantially impair the ability of the floodplain to convey floodwaters from extreme storm events, and the facility would be designed to be withstand inundation by such events without substantial damage. Additionally, the long history of municipal planning and public support for a longitudinal roadway within the Dallas Floodway (e.g., 1998 Dallas bond election, and Stemmons deed; see **FEIS Sections 1.1.2** and **2.8.4.3**) indicate continued support for a floodway alternative after decades of public scrutiny. In light of the foregoing considerations, as well as other information assessed as part of the SDEIS and LSS regarding natural and beneficial values of floodplains, the expected impacts of Alternative 3C would not prevent it from being considered practicable as to this factor.

3C: Waters of the U.S., including Wetlands, and Water Quality

The ROW footprint of Alternative 3C (as reported in the SDEIS, as supplemented by the LSS) would adversely affect 27.4 acres of waters of the U.S., including wetlands, as the result of fill from the construction of road surfaces and bridges. An additional 63.5 acres of excavation impacts would occur. The combined ROW and excavation impacts (90.9 acres) would result in a combination of temporary and permanent impacts to approximately 37.6 acres of emergent wetlands, 1.3 acres of forested wetlands, 7.0 acres of intermittent open water, 1.5 acres of old Trinity River channel, 0.2 acre of intermittent stream, and 43.3 acres of the Trinity River main stem channel. These expected impacts would be subject to the conditions and mitigation requirements of the Section 404 and Section 10 permit process. Similarly, potential construction-related erosion from construction sites would be subject to the requirement of a SWPPP and the employment of appropriate BMPs to minimize migration of eroded soil offsite into surface waters. The impacts to habitat within the Trinity River floodplain have been minimized and efforts to further minimize impacts would continue through final project design. The functions and values of aquatic resources adversely affected by Alternative 3C are part of the USACE Section 404 permit review process, which includes a review under the Section 404(b)(1) Guidelines, water quality certification under Section 401, and provisions addressing mitigation. Drafts of these elements of the Section 404 permit process are included in **SDEIS Appendices H** and **J** to ensure that aspect of potential harm to natural resources is addressed prior to issuance of a ROD. Considering the

level of impacts to aquatic features and water quality, the regulatory requirements designed to minimize and mitigate for impacts, and the functions, values, and quality of aquatic resources that would be affected, Alternative 3C would be a practicable alternative with respect to this evaluation factor despite the anticipated impacts to aquatic resources.

3C: Fish and Wildlife Habitat Values

The level of impact of Alternative 3C on wildlife was assessed primarily in terms of anticipated impacts to high quality habitat such as riparian forests and some aquatic habitats, as summarized above for habitat-related factors. The construction of Alternative 3C would result in limited habitat fragmentation from the clearing of riparian forest areas near the southern end of the project alignment. Mitigation for impacts to riparian forest and aquatic habitats would include efforts to avoid and minimize impacts as well mitigation for long-term compensation of habitat impacts. This alternative is not expected to result in an adverse effect/impact to any federally- or state-listed threatened or endangered species, or state species of concern. Accordingly, Alternative 3C is considered a practicable alternative with respect to this evaluation factor.

3C: Conservation

Energy, fuel, and materials consumption would occur during construction and operation of Alternative 3C. As this alternative would operate as an all-electronic toll collection facility, which provides operational efficiencies to reduce stop and go traffic conditions, lower fuel/energy consumption is expected. In addition, the highway construction materials that would be expended are not in short supply and therein would not adversely affect continued availability of similar resources. Alternative 3C, therefore, is considered a practicable alternative with respect to this evaluation factor.

3C: Needs and Welfare of the Community

Alternative 3C generally avoids impacts to neighborhoods and commercial districts within the project corridor because much of the alignment is within the Dallas Floodway. Alternative 3C would result in an estimated displacement of 15 to 20 businesses and 72 to 203 jobs.

Acceptance of Alternative 3C by the City of Dallas is reasonably assured, as it is consistent with the citywide bond approval from May 2, 1998 in which Dallas residents supported a Trinity Parkway location within the Dallas Floodway. This alternative would also be consistent with a citywide special election held on November 6, 2007, which determined that the city should continue to consider alternatives in the Dallas Floodway for the Trinity Parkway. Support of Alternative 3C was communicated during the official comment period for the DEIS, SDEIS, and LSS public hearings. Several Dallas City Council members and the Mayor submitted public

comments in support of Alternative 3C, and business associations, which represent hundreds of local businesses, also submitted comments in support of Alternative 3C. Stated reasons for support of Alternative 3C included: (i) it is the lowest cost alternative; (ii) the design is compatible with the BVP; and (iii) the alternative would cause only minor impacts to the local businesses.

Regarding future land use plans, the Dallas City Council approved the renaming of Industrial Boulevard to "Riverfront Boulevard" in November 2008 and local business owners consider this a positive influence to support mixed-use redevelopment in the area. As reported in **SDEIS Section 3.1.1.1 (SDEIS pages 3-5 through 3-7)**, tax-increment financing (TIF) districts have also been created for the Cedars and Design Districts to promote mixed-use redevelopment. Development includes commercial infill development in the Design District, as well as infill of residential lofts and similar development along the corridor. Alternative 3C would not conflict with these development plans, and would enhance mobility to developed areas away from the CBD and would not interfere with traffic circulation with the downtown area.

In addition, the City of Dallas has widely publicized its “Trinity River Corridor Project,” which is actually the name for a series of proposed projects that are along the main stem and Elm Fork of the Trinity River in Dallas. Since 2003, the city has planned for Trinity Parkway to have a combined parkway riverside layout, balancing the Trinity Parkway embankments with proposed excavation of lakes in the Dallas Floodway as part of the city’s Trinity River Corridor BVP (City of Dallas, 2003a). Alternative 3C would be consistent with the BVP and these development plans, and would enhance mobility to developed areas.

Lastly, there has been a longstanding intent in Dallas to include a major roadway in the Dallas Floodway, most notably derived from the Stemmons Deed Precedent. Therefore, the compatibility of Alternative 3C with the needs and welfare of the community, along with local development plans, makes it a practicable alternative with respect to this factor.

3C: Economic Impacts

Alternative 3C is estimated to lead to the displacement of 15 to 20 businesses and 72 to 203 jobs. Alternative 3C would also result in the net loss of 157 acres of mostly developed land that is privately owned (see **LSS Section 4.1.6.1 and 4.1.7.1**). The conversion of business properties to ROW would remove an estimated $54 million from the City of Dallas tax base and annual tax revenue for the combined taxing entities (Dallas County, City of Dallas, and DISD). The annual combined loss of revenue for these three taxing entities would be an estimated $1.5 million. Although the overall direct and long term indirect economic impacts to the Dallas CBD of Alternative 3C would be adverse, this alternative is considered practicable as to this factor.

3C: Air Quality Impacts

Although the USEPA-designated ten-county DFW area is in non-attainment for ozone, regional planners are pursuing congestion management measures to reduce levels of ozone. Local concentrations of carbon monoxide are not expected to exceed federal standards at any time, and daily MSAT emissions are expected to substantially decrease due in large part to the implementation of USEPA's motor vehicle emission control standards. Consequently, no adverse air quality impacts are anticipated from Alternative 3C, making it a practicable alternative in terms of air quality.

3C: Traffic Noise Impacts

The construction of Alternative 3C would result in traffic noise impacts to 127 noise receivers and one park. Mitigation for impacts to noise receivers would include efforts to avoid and minimize traffic noise impacts. Accordingly, Alternative 3C is considered a practicable alternative with respect to this evaluation factor.

3C: Impact of Floods on Human Safety

Alternative 3C would be located within the Dallas Floodway for approximately 70 percent of its length. Approximately 297 acres of Alternative 3C would be located in the 100-year (base) floodplain. Regarding Alternative 3C, the approach is to provide a hydraulically neutral design with respect to the Dallas Floodway function by balancing the Trinity Parkway embankments with corresponding excavations in the Dallas Floodway. As modeled in the SDEIS, Alternative 3C would meet the USACE criteria pertaining to valley storage and changes in floodwater velocities, and has been designed not to interfere with the USACE's or the city's ability to operate and maintain the Dallas Floodway, conduct flood fighting activities, or restore or improve the flood damage reduction capability of the federal project.

With regard to changes in floodwater surface elevation, the USACE criteria state there should be no rise in the 100-year or SPF elevation for the proposed condition (USACE, 1988). Alternative 3C would result in a maximum rise of 0.41 feet for the 100-year elevation and 0.03 feet for the SPF elevation. These rises in 100-year and SPF elevations would be evaluated and fine-tuned during the detailed design phase if Alternative 3C is identified as the FHWA-recommended alternative. Hydraulic neutrality required for ultimate approval of this alternative may be obtained due to changes in results generated by continued hydraulic modeling of final design refinements. However, if a modeled surface water elevation cannot be reduced to meet the 1988 ROD criteria, it would be necessary for Alternative 3C to receive variance authorization from the USACE Fort Worth District Commander before the project could be constructed.

Another issue related to human safety during floods is the possible danger to motorists of flooding over the proposed roadway. Alternative 3C would primarily be protected by the physical elevation of the roadway above the computed 100-year event in the Dallas Floodway. Additionally, as described in **SDEIS Section 2.4.7 (SDEIS page 2-62),** the roadway would be protected by walls and pump stations at low points under existing bridges. In the event of a pump failure, the sags would fill with water after continual rainfall; however, this would be a gradually deepening condition and not a flash flood. In the event of a wall overtopping from the river levels (which would result in rapid inundation of the road), the Trinity Parkway would be closed well in advance of any anticipated overtopping under the directives of the Emergency Action Plan (see **SDEIS Appendix K-3** for additional details regarding the Emergency Action Plan).

Because of the hydraulically neutral design approach, the requirements for no interference with floodway operations and maintenance, and the development of the Emergency Action Plan, Alternative 3C is not expected to adversely impact human safety with respect to the Dallas Floodway's ability to convey floods. To date, feedback from the USACE has indicated that "the proposed Trinity Parkway is feasible from the Corps perspective" and the USACE has not pointed out any unresolvable deficiency in the design of Alternative 3C that would prevent it from receiving a favorable review under 33 U.S.C. Section 408 (see **FEIS Appendix A-2**, Pages 67-68). Therefore, Alternative 3C is considered a practicable alternative with respect to this evaluation factor.

3C: Risks Associated with Implementation of the Action

The risks associated with this section focus on levee stability issues. Levee stability risks are an aspect of the Dallas Floodway that have been taken into consideration in the design development of Alternative 3C. As Alternative 3C has undergone changes in design features related to embankment and levee stability, it is considered a practicable alternative with respect to this evaluation factor.

3C: Incompatible Development

Generally, the majority of the wetlands in the project area are within the Dallas Floodway and would unlikely be developed due to flood risk and regulation of development in floodplains, as well as the municipal ownership of the land. The protection of the Dallas Floodway and the related sump areas from development is also expected to be stringent because of the regulatory interest in the federal flood protection project. Accordingly, there would be no induced incompatible development in floodplains or wetlands in the Dallas Floodway or sump areas due to the implementation of Alternative 3C

Future development in the Dallas Floodway is expected to be controlled closely by the USACE and the City of Dallas as the Dallas Floodway owner. Proposed BVP improvements are intended to be flood resistant in keeping with the Dallas Floodway setting, and are of the type (e.g., parks, lakes, trails) which are generally recognized as being appropriate and compatible in floodplains.

One of the objectives of the proposed project is to provide compatibility with local development plans. The location of Alternative 3C inside the floodplain would not restrict development on the landside of the Dallas Floodway. Alternative 3C would generally avoid disruption of the business district situated between the Dallas CBD and the East Levee, which would be consistent with the city's vision for this area. Alternative 3C is consistent with the City of Dallas land use planning to date, including the city's BVP for the Trinity River Corridor. As Alternative 3C would be compatible with local development and comprehensive land use plans, it is clearly a practicable alternative as to this factor.

3C: Aesthetics

The issue of visual intrusion was one of the concerns for the proposed design during development of the city's BVP (City of Dallas, 2003a). Within the Dallas Floodway, Alternative 3C would be visible to recreational users between the levees. In some cases, the roadway and access ramps would be visible outside the levees, while in other cases the roadway would be hidden from view behind the Trinity Parkway's flood separation wall. The flood separation wall itself would be visible in some locations, but in most places, an earthen embankment would be built against the riverside face of the flood separation wall. In these locations, the combined flood separation wall/embankment would visually resemble the levees. The screening provided by the East Levee would restrict the Trinity Parkway's visibility from adjacent landside properties and buildings in the Dallas CBD. Alternative 3C would not substantially limit the views of most commercial businesses and residential neighborhoods beyond the immediate corridor.

The most common view for future motorists driving along Alternative 3C would be of the East Levee and the flood separation wall along the western edge of the roadway. The East Levee would limit the view from Alternative 3C (northbound) toward many of the commercial businesses and residential neighborhoods on the other side of the levee and toward the Dallas CBD. Alternative 3C is considered practicable with respect to this evaluation factor.

3C: Historic Values

No significant adverse effects to archeological resources or non-archeological historic sites would occur due to Alternative 3C. Accordingly, Alternative 3C is considered a practicable alternative with respect to this evaluation factor.

3C: EO Practicability Based on All Factors Combined

Alternative 3C could be built within existing natural, social, and economic constraints applicable to the project area and is, therefore, a practicable alternative. Alternative 3C is practicable as to cost, as well as all other factors considered. The principal disadvantages of Alternative 3C include the requirement for floodplain modifications and unavoidable wetland impacts within the Dallas Floodway. Due to community and agency interest in the integrity of the flood conveyance ability of the floodway, this summary emphasizes related impacts. It is possible that Alternative 3C might not meet criteria specified in the 1988 TREIS ROD, which includes no rise in the 100-year or SPF elevation. As reported in the SDEIS, Alternative 3C would result in a maximum rise of 0.41 feet for the 100-year elevation and 0.03 feet for the SPF elevation. The water surface rises for Alternative 3C, however, may be regarded as manageable considering the magnitude and locations where the rises occur. Additionally, minimal or no change to existing drainage patterns would be expected within or down gradient from the project area as a result of Alternative 3C. This alternative has been designed to avoid interference with O&M of the Dallas Floodway. Although there would be lost tollway revenue and flood damage restoration costs associated with greater than 100-year flood events, such attendant costs would be included in the funding plan for O&M for the tollway.

Alternative 3C is consistent with City of Dallas plans and policies, and actively supported by both the city, the Dallas business community, and by a majority of voters. Although adverse impacts would occur such as displacements and disruption of urban areas during construction, these impacts appear to be sufficiently offset by the benefits of the alternative as to retain city and community support. Evaluation of the 16 factors considered has not identified any serious impediment to the constructability of this alternative, which is found to be practicable under the policies set out in EO 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), and implementing regulations.

2.8.5.4 EO Practicability of Build Alternative 4B

4B: Project Cost

The practicability of Alternative 4B on the basis of cost was evaluated after first developing a cost screen from the combined construction costs and ROW/utilities relocation costs of comparable

toll road projects constructed or planned in urban areas of Texas. Applying that cost screen to Alternative 4B indicates that its costs would be 11 percent greater per mainlane mile than the cost screen that was established at $20 million per mainlane mile. Accordingly, and allowing for the vagaries of estimating costs for major transportation projects, it appears that Build Alternative 4B is reasonably within range of the cost screen based on the costs normally associated with this type of project. In light of this information, Alternative 4B is practicable based on project cost.

4B: Existing Technology

As Alternative 4B would utilize current engineering technology for roadway and related construction, there is no basis to expect any unusual or insurmountable technological issues that would affect constructability. Alternative 4B, therefore, is considered practicable with regard to existing technology.

4B: Logistics

Several logistical elements related to construction have been examined, as evidenced by the combined influence these elements would have on the time necessary to construct Alternative 4B. Logistical elements affect the level of difficulty to complete construction, and therefore the time needed to complete construction as well as the level of inconvenience to the surrounding community such as road/lane closures and detours. The estimated length of time from startup of engineering/construction activities until the Trinity Parkway could be fully open to traffic is estimated to be approximately 6 years for Alternative 4B. This lengthy time-to-construct is attributable to the need to acquire the ROW and displace buildings on approximately 35 properties, which would involve demolition activity and associated hazardous material abatement. Additional time would be required to address site contamination on 17 high-risk hazardous materials sites and the relocation of overhead and subsurface utilities found particularly within the northern and southern ends of the proposed project. Also, construction of those portions of this alternative occurring outside the Dallas Floodway would be within a busy urban area, and would unavoidably result in many road and lane closures and detours that would be required. Construction of Alternative 4B primarily within the Dallas Floodway would isolate much of the construction activity from the surrounding urban areas, thereby minimizing some logistical challenges. A 6-year construction period for Alternative 4B would not preclude further consideration of this alternative as it would be “capable of being done” according to the definition of practicable in 23 CFR Section 650.105(k).

4B: Natural and Beneficial Values Served by Floodplains

The significant and longitudinal encroachments of Alternative 4B (and its predecessor) have been the subject of great scrutiny since the outset of the Trinity Parkway development process. The

SDEIS and LSS provide detailed hydrologic, hydraulic, and other engineering analyses and design focused on addressing the potential risks associated with construction of a roadway within the particular floodplain environment of the Dallas Floodway, several aspects of which are highlighted here. The ROW footprint for Alternative 4B would have a floodplain encroachment footprint of 418 acres, and would disturb an additional 335.6 acres of floodplain areas for the excavation of material needed to construct roadway embankment and for other construction purposes. The combined effects of these aspects of construction would result in 753.6 acres of impacts to undeveloped areas within the Trinity River floodplain, including impacts to the following habitats: riparian forest, 29.3 acres; waters of the U.S., including wetlands, 110.6 acres; and maintained non-native grassland, 573.1 acres. All of the expected impacts to excavation areas would be temporary, as would approximately half of the impacts to areas within the roadway ROW footprint, and these areas would be revegetated with native grasses. All impacts to forested areas would be permanent, and these areas along with other areas of high quality habitat would be addressed with compensatory mitigation. As evaluated in the SDEIS and LSS, Alternative 4B would adversely affect floodplain values related to wildlife movement, open space loss, and outdoor recreation potential due to the construction, operation, and maintenance of the new ROW. However, consideration has also been given to the history of human alteration of these same floodplain values as a result of the creation of the Dallas Floodway, the predominance of non-native grasslands throughout non-forested floodplain areas, and the active regimen of mowing and other operations and maintenance activities related to levees and the floodplain floor. As discussed in **FEIS Section 2.8.4.2**, the longitudinal encroachment of this alternative within the Dallas Floodway would not substantially impair the ability of the floodplain to convey floodwaters from extreme storm events, and the facility would be designed to be withstand inundation by such events without substantial damage. Additionally, the long history of municipal planning and public support for a longitudinal roadway within the Dallas Floodway (e.g., 1998 Dallas bond election, and Stemmons deed; see **FEIS Sections 1.1.2** and **2.8.4.3**) indicate continued support for a floodway alternative after decades of public scrutiny. In light of the foregoing considerations, as well as other information assessed as part of the SDEIS and LSS regarding natural and beneficial values of floodplains, the expected impacts of Alternative 4B would not prevent it from being considered practicable as to this factor.

4B: Waters of the U.S., including Wetlands, and Water Quality

The ROW footprint of Alternative 4B would adversely affect 47.1 acres of waters of the U.S., including wetlands, as the result of fill from the construction of road surfaces and bridges. An additional 63.5 acres of excavation impacts would occur. The combined ROW and excavation impacts (110.6 acres) would result in a combination of temporary and permanent impacts to approximately 56.4 acres of emergent wetlands, 1.3 acres of forested wetlands, 8.3 acres of

intermittent open water, 1.2 acres of old Trinity River channel, 0.1 acre of intermittent stream, and 43.3 acres of the Trinity River main stem channel. These expected impacts would be subject to the conditions and mitigation requirements of an individual permit under Section 404. Similarly, potential construction-related erosion from construction sites would be subject to the requirement of a SWPPP and the employment of appropriate BMPs to minimize migration of eroded soil offsite into surface waters. The impacts to habitat within the Trinity River floodplain have been minimized and efforts to further minimize impacts would continue through final project design. The functions and values of aquatic resources adversely affected by Alternative 4B are part of the USACE Section 404 permit review process, which includes a review under the Section 404(b)(1) Guidelines, water quality certification under Section 401, and provisions addressing mitigation. Drafts of these elements of the Section 404 permit process are included in **SDEIS Appendices H** and **J** to ensure that aspect of potential harm to natural resources is addressed prior to issuance of a ROD. Considering the level of impacts to aquatic features and water quality, the regulatory requirements designed to minimize and mitigate for impacts, and the functions, values, and quality of aquatic resources that would be affected, proposed Alternative 4B would be a practicable alternative with respect to this evaluation factor despite the anticipated impacts to aquatic resources.

4B: Fish and Wildlife Habitat Values

The level of impact of Alternative 4B on wildlife was assessed primarily in terms of anticipated impacts to high quality habitat such as riparian forests and some aquatic habitats, as summarized above for habitat-related factors. The construction of Alternative 4B would result in limited habitat fragmentation from the clearing of riparian forest areas near the southern end of the project alignment. Mitigation for impacts to riparian forest and aquatic habitats would include efforts to avoid and minimize impacts as well mitigation for long-term compensation of habitat impacts. This alternative is not expected to result in an adverse effect/impact to any federally- or state-listed threatened or endangered species, or state species of concern. Accordingly, Alternative 4B is considered a practicable alternative with respect to this evaluation factor.

4B: Conservation

Energy, fuel, and materials consumption would occur during construction and operation of Alternative 4B. As this alternative would operate as an all-electronic toll collection facility, which provides operational efficiencies to reduce stop and go traffic conditions, lower fuel/energy consumption is expected. In addition, the highway construction materials that would be expended are not in short supply and therein would not adversely affect continued availability of similar resources. Alternative 4B, therefore, is considered a practicable alternative with respect to this evaluation factor.

4B: Needs and Welfare of the Community

Alternative 4B generally avoids impacts to neighborhoods and commercial districts within the project corridor because much of the alignment is within the Dallas Floodway. Alternative 4B would result in an estimated displacement of 13 to 16 businesses and 62 to 187 jobs.

Acceptance of Alternative 4B by the city is reasonably assured, as it is consistent with the citywide bond approval from May 2, 1998 in which Dallas residents supported a Trinity Parkway location within the Dallas Floodway. This alternative would also be consistent with a citywide special election held on November 6, 2007, which determined that the city should continue to consider alternatives in the Dallas Floodway for the Trinity Parkway. Support of Alternative 4B was generally communicated during the official comment period for the DEIS, SDEIS, and LSS public hearings. Business associations, which represent hundreds of local businesses, also submitted comments in support of a floodway alternative.

Regarding future land use plans, the Dallas City Council approved the renaming of Industrial Boulevard to "Riverfront Boulevard" in November 2008 and local business owners consider this a positive influence to support mixed-use redevelopment in the area. As reported in **SDEIS Section 3.1.1.1 (SDEIS pages 3-5 through 3-7)**, tax-increment financing (TIF) districts have also been created for the Cedars and Design Districts to promote mixed-use redevelopment. Development includes commercial infill development in the Design District, as well as infill of residential lofts and similar development along the corridor. Alternative 4B would not conflict with these development plans, and would enhance mobility to developed areas away from the CBD and would not interfere with traffic circulation with the downtown area. Lastly, here has been a longstanding intent in Dallas to include a major roadway in the Dallas Floodway, most notably derived from the Stemmons Deed Precedent.

In addition, the City of Dallas has widely publicized its “Trinity River Corridor Project,” which is actually the name for a series of proposed projects that are along the main stem and Elm Fork of the Trinity River in Dallas. Since 2003, the city has planned for Trinity Parkway to have a combined parkway riverside layout, balancing the Trinity Parkway embankments with proposed excavation of lakes in the Dallas Floodway as part of the city’s Trinity River Corridor BVP (City of Dallas, 2003a). Alternative 4B is be consistent with many of the city’s development plans and would enhance mobility to developed areas, but is inconsistent with the BVP.

In summary, Alternative 4B is consistent with many City of Dallas plans and policies, although it has not been endorsed by the city as the locally-preferred alternative for the Trinity Parkway.

However, this alternative is inconsistent with the BVP, which currently envisions the Trinity Parkway along the East Levee only. This inconsistency is a substantial matter weighing against the practicability of this alternative. However, it is not considered to be of such magnitude to prevent the FHWA from concluding that Alternative 4B is practicable. Although adverse impacts would occur such as displacements and disruption of urban areas during construction, these impacts appear to be sufficiently offset by the benefits of the alternative so as to retain city and community support. Overall, Alternative 4B is considered practicable as to this factor.

4B: Economic Impacts

Alternative 4B is estimated to lead to the displacement of 13 to 16 businesses and 62 to 187 jobs. Alternative 4B would also result in the net loss of 167 acres of mostly developed land that is privately owned (see **LSS Sections 4.1.6.1 page 4-52** and **4.1.7.1 page 4-80**). The conversion of business properties to ROW would remove an estimated $36 million from the City of Dallas tax base and annual tax revenue for the combined taxing entities (Dallas County, City of Dallas, and DISD), and the annual combined loss of revenue for these three taxing entities would be an estimated $1 million. Although the overall direct and long term indirect economic impacts to the Dallas CBD of Alternative 4B would be adverse, this alternative is considered practicable as to this factor.

4B: Air Quality Impacts

Although the USEPA-designated ten-county DFW area is in non-attainment for ozone, regional planners are pursuing congestion management measures to reduce levels of ozone. Local concentrations of carbon monoxide are not expected to exceed federal standards at any time, and daily MSAT emissions are expected to substantially decrease due in large part to the implementation of USEPA's motor vehicle emission control standards. Consequently, no adverse air quality impacts are anticipated from Alternative 4B, making it a considered practicable alternative.

4B: Traffic Noise Impacts

The construction of Alternative 4B would result in traffic noise impacts to 164 noise receivers and two parks. Mitigation for impacts to noise receivers would include efforts to avoid and minimize traffic noise impacts. Accordingly, Alternative 4B is considered a practicable alternative with respect to this evaluation factor.

4B: Impact of Floods on Human Safety

Alternative 4B would be located within the Dallas Floodway for approximately 70 percent of its length. Approximately 418 acres of Alternative 4B would be located in the 100-year (base)

floodplain. Regarding Alternative 4B, the approach is to provide a hydraulically neutral design with respect to the Dallas Floodway function by balancing the Trinity Parkway embankments with corresponding excavations in the Dallas Floodway. As modeled in the SDEIS, Alternative 4B would meet the USACE criteria pertaining to valley storage and changes in floodwater velocities, and has been designed not to interfere with the USACE's or the city's ability to operate and maintain the Dallas Floodway, conduct flood fighting activities, or restore or improve the flood damage reduction capability of the federal project.

With regard to changes in flood elevation, the USACE criteria state there should be no rise in the 100-year or SPF elevation for the proposed condition (USACE, 1988). Alternative 4B would result in a maximum rise of 1.2 feet for the 100-year elevation and 0.71 feet for the SPF elevation. These rises in 100-year and SPF elevations would be evaluated and fine-tuned during the detailed design phase if Alternative 4B is identified as the FHWA-recommended alternative. Hydraulic neutrality required for ultimate approval of this alternative may be obtained due to chance results generated by continued hydraulic modeling of final design refinements. However, if a modeled surface water elevation cannot be reduced to meet the 1988 ROD criteria, it would be necessary for a floodway alternative to receive variance authorization from the USACE Fort Worth District Commander before the project could be constructed.

Another issue related to human safety during floods is the possible danger to motorists of flooding over the proposed roadway. Alternative 4B would primarily be protected by the physical elevation of the roadway above the computed 100-year event in the Dallas Floodway. Additionally, as described in **SDEIS Section 2.4.7 (page 2-62),** the roadway would be protected by walls and pump stations at low points under existing bridges. In the event of a pump failure, the sags would fill with water after continual rainfall; however, this would be a gradually deepening condition and not a flash flood. In the event of a wall overtopping from the river levels (which would result in rapid inundation of the road), the Trinity Parkway would be closed well in advance of any anticipated overtopping under the directives of the Emergency Action Plan (see **SDEIS Appendix K-3** for additional details regarding the Emergency Action Plan).

Because of the hydraulically neutral design approach, the requirements for no interference with floodway operations and maintenance, and the development of the Emergency Action Plan, Alternative 4B is not expected to adversely impact human safety with respect to the Dallas Floodway's ability to convey floods. To date, feedback from the USACE has indicated that "the proposed Trinity Parkway is feasible from the Corps perspective" and the USACE has not pointed out any unresolvable deficiency in the design of Alternative 4B that would prevent it from receiving a favorable review under 33 U.S.C. Section 408 (see **FEIS Appendix A-2** page 67).

Therefore, Alternative 4B is considered a practicable alternative with respect to this evaluation factor.

4B: Risks Associated with Implementation of the Action

The risks associated with this section focus on levee stability issues. Levee stability risks are an aspect of the Dallas Floodway that has been taken into consideration in the design development of Alternative 4B. As Alternative 4B has undergone changes in design features related to embankment and levee stability, it is considered a practicable alternative with respect to this evaluation factor.

4B: Incompatible Development

Generally, the majority of the wetlands in the project area are within the Dallas Floodway and would unlikely be developed due to flood risk and regulation of development in floodplains, as well as the municipal ownership of the land. The protection of the Dallas Floodway and the related sump areas from development is also expected to be stringent because of the regulatory interest in the federal flood protection project. Accordingly, there would be no induced incompatible development in floodplains or wetlands in the Dallas Floodway or sump areas due to the implementation of Alternative 4B.

Future development in the Dallas Floodway is expected to be controlled closely by the USACE and the City of Dallas as the Dallas Floodway owner. Proposed BVP improvements are intended to be flood resistant in keeping with the Dallas Floodway setting, and are of the type (e.g., parks, lakes, trails) which are generally recognized as being appropriate and compatible in floodplains.

One of the objectives of the proposed project is to provide compatibility with local development plans. The location of Alternative 4B inside the floodplain would not restrict development on the landside of the Dallas Floodway. Alternative 4B would generally avoid disruption of the business district situated between the Dallas CBD and the East Levee, which would be consistent with the city's vision for this area. However, the location of Alternative 4B along both the East Levee and West Levee within the Dallas Floodway is inconsistent with the city's BVP. Although this inconsistency is an important aspect affecting the suitability of this alternative, it is considered of insufficient magnitude to prevent the FHWA from concluding that Alternative 4B is practicable.

4B: Aesthetics

The issue of visual intrusion was one of the concerns for the proposed design during development of the city's BVP (City of Dallas, 2003a). Within the Dallas Floodway, Alternative 4B would be visible to recreational users between the levees; in some cases, the roadway itself and

access ramps would be visible, while in other cases, the roadway would be hidden from view behind the Trinity Parkway's flood separation wall. The flood separation wall would be visible in some locations, but in most places, an earthen embankment would be built against the riverside face of the flood separation wall. In these locations, the combined flood separation wall/embankment would visually resemble the levees. The screening provided by the East Levee would restrict the Trinity Parkway's visibility from adjacent landside properties and buildings in the Dallas CBD. Alternative 4B would not substantially limit the views of most commercial businesses and residential neighborhoods beyond the immediate corridor.

The most common view for future motorists from Alternative 4B would be of a flood separation wall on one side and either the East Levee (northbound) or west levee (southbound) on the other. The East Levee would limit the view from Alternative 4B (northbound) toward many of the commercial businesses and residential neighborhoods on the other side of the levee and toward the Dallas CBD. However, it is expected that motorists would be able to see the skyline of the CBD from the southbound lanes of Alternative 4B on the west side of the floodway. As Alternative 4B is compatible with local development plans, it is considered a practicable alternative with respect to this evaluation factor.

4B: Historic Values

No significant adverse effects to archeological resources or non-archeological historic sites would occur due to Alternative 4B. Accordingly, Alternative 4B is considered a practicable alternative with respect to this evaluation factor.

4B: EO Practicability Based on All Factors Combined

Alternative 4B could be built within existing natural, social, and economic constraints applicable to the project area and is, therefore, a practicable alternative. Alternative 4B is practicable as to cost, as well as all other factors considered. The principal disadvantages of Alternative 4B include the requirement for floodplain modifications and unavoidable wetland impacts within the Dallas Floodway. Due to community and agency interest in the integrity of the flood conveyance ability of the floodway, this summary emphasizes related impacts. It is possible that Alternative 4B might not meet criteria specified in the 1988 TREIS ROD, which includes no rise in the 100-year or SPF elevation. As reported in the SDEIS, Alternative 4B would result in a maximum rise of 1.2 feet for the 100-year elevation and 0.71 feet for the SPF elevation. The water surface rises for Alternative 4B, however, may be regarded as manageable considering the magnitude and locations where the rises occur. Additionally, minimal or no change to existing drainage patterns would be expected within or down gradient from the project area as a result of Alternative 4B. This alternative has been designed to avoid interference with O&M of the Dallas Floodway,

although there would be lost tollway revenue and flood damage restoration costs associated with greater than 100-year flood events. However, such attendant costs would be included in the funding plan for O&M for the tollway.

2.8.6 FHWA Only Practicable Alternative Findings

In accordance with FHWA Technical Advisory T6640.8A (1987), this section reports the FHWA's findings as to practicability for the four Build Alternatives as required by EO 11990 (Protection of Wetlands) and EO 11988 (Floodplain Management). In the discussion of each finding below, an explanation is provided as to why there are no practicable avoidance alternatives to the proposed action. Additionally, each finding includes an explanation as to why the proposed action includes all practicable measures to minimize harm to wetlands or floodplains, respectively. Additional information relative to compliance with federal and local floodplain protection standards is provided with regard to the floodplain finding.

2.8.6.1 Only Practicable Alternative Finding Regarding Impacts to Wetlands

There are no practicable alternatives to the proposed action that would wholly avoid impacts to wetlands. As discussed in **FEIS Section 2.1.2** (see also **Appendix G-1**, **Section 2.3.1**), the MTIS considered improvements to the IH-35E corridor (which would likely have avoided impacts to wetlands), but such alternatives were determined to be impractical in the MTIS due to excessive cost, physical constraints of adding traffic lanes in the Mixmaster, and impacts to adjacent properties (TxDOT, 1998b). Among the four Build Alternatives considered in this FEIS, Alternatives 2A and 2B would result in relatively minor impacts to wetlands as compared to Alternatives 3C and 4B (see **Table 2-14**). However, the FHWA finds that both Alternatives 2A and 2B would result in excessive costs as compared to other comparable toll projects, and are not practicable alternatives primarily based on the project cost, but also based on the needs and welfare of the community, economic impacts, and aesthetics.

The ROW impacts of Alternative 4B to emergent wetlands (35.77 acres) are slightly more than double the amount of impacts from Alternative 3C (17.01 acres) (see **Table 2-14**). Borrow area impacts for both Alternatives 3C and 4B to emergent wetlands are estimated at 20.63 acres. The combined ROW and borrow area impacts to emergent wetlands for Alternative 3C (37.64 acres) are 18.74 acres less than impacts expected for Alternative 4B (56.40 acres). The impacts of both floodway alternatives to forested wetlands are similar (i.e., approximately 1.28 acres). Based on relative impacts anticipated by these alternatives to wetland resources in the project area, the FHWA finds Alternative 3C to have substantially fewer impacts to wetlands than Alternative 4B.

Accordingly, Alternative 3C is found be the least environmentally damaging practicable alternative pursuant to EO 11990 (Protection of Wetlands) and implementing regulations.

Avoiding and minimizing impacts to waters of the U.S., including wetlands, have been a major area of emphasis throughout the Trinity Parkway project development process. However, designing a major roadway within the Dallas Floodway presents unique challenges that arise from competing constraints. As the floodway's primary objective is to safely convey floodwaters, the placement of a major roadway must be done to ensure that the facility remains hydraulically neutral in terms of the 1988 TREIS ROD. That decision document adopted performance criteria that must be met before a project that would alter the cross section geometry of the floodway may be approved by the USACE. Most notably, constraints regarding maximum water surface elevation and valley storage for the 100-year flood and the SPF require iterative hydraulic modeling to achieve results that are at or near the 1988 ROD criteria. To maintain hydraulic balance within the floodway, the roadway embankment material must be excavated within the floodway. With a floodplain peppered with emergent wetland areas, it is a daunting challenge to excavate from one area within the floodway so that the fill material may be used to build the road embankment elsewhere.

Another major constraint in planning the Trinity Parkway relates to the placement of the roadway relative to the East Levee. Engineering concerns about levee safety have led to the requirement to modify floodway Build Alternatives to ensure a prescribed offset is kept, thus moving the roadway farther into the floodplain where aquatic features are more abundant. Thus, the evolution of project design has been a process of balancing the design of roadway and excavation areas to achieve hydraulic neutrality, levee safety, and avoidance of aquatic features. Accordingly, the history of efforts to avoid aquatic features in the design of the Trinity Parkway has been balanced by the need to ensure the safe operation of the Dallas Floodway as it conveys floodwaters.

The following list highlights some of the measures taken to avoid and minimize impacts to water features while balancing the need for hydraulic neutrality and levee safety.

- Roadway design modifications made to minimize impacts involved shortening the extent of the embankment in the floodway through the use of a gravity wall at the base of the embankment. In addition, the roadway design was modified to remove embankment previously planned to be placed on the river side of proposed flood separation walls that protect the roadway from flood events in the areas where the roadway profile would be lower to pass under the existing bridges crossing the floodway. These two design

refinements narrowed the overall footprint of the proposed roadway and thereby helped to offset the encroachment further into the floodway and associated wetlands that resulted from the shift away from the east levee at the direction of the USACE to avoid levee-side retaining walls (see **FEIS Section 2.3.2.3**). These changes avoided an increase in impacts from fill that would have occurred otherwise.

- During the development of the excavation plan for roadway embankment material, thoughtful consideration was given to minimizing impacts to jurisdictional waters, while balancing the needs for suitable material, the need to excavate large contiguous areas in proximity to the roadway in the interest of having a plan that makes sense in terms of construction logistics, as well as a desire to be compatible with local plans for the floodway (i.e., the City of Dallas BVP and the USACE's flood damage reduction plan).
- The borrow locations upstream of the IH-35E bridges have been placed in areas of the floodway overbank where emergent wetlands are less prominent. For example, excavation was completely avoided within the east overbank upstream of Westmoreland Road and within the entire floodway overbank on both sides of the channel between Continental Avenue and the Hampton Road bridges, with the exception of a small area of excavation proposed just on the upstream side of the Continental Avenue viaduct. In addition, with the exception of a small amount (less than 3 acres) of excavation within the Trinity River, all of the waters of the U.S., including wetlands that were identified as high quality features were avoided by the proposed borrow plan.
- Unfortunately, in the area between the IH-35E bridges and the DART bridge at the south end of the floodway, large areas of emergent wetlands are present and excavations in this area are needed for hydraulic reasons. The Dallas Floodway narrows in the area of the Houston Street and Jefferson Boulevard bridges, creating a need for excavation downstream to keep water surface elevations in check. As such, the impacts to jurisdictional waters in this area could not be completely avoided.

Iterative hydraulic modeling has been conducted in coordination with the USACE during the project development process to ensure that proposed embankments are offset by excavations and other design aspects so that the project will either meet the 1988 ROD criteria or be sufficiently close to those criteria to warrant consideration of a variance. As demonstrated above, ongoing coordination has been occurring with the USACE and the City of Dallas to ensure that the schematic design of Alternative 3C minimizes impacts to waters of the U.S., including wetlands, and would also be compatible with the flood conveyance mission of the Dallas Floodway. While minimizing impacts to jurisdictional water features, the hydraulic results for the proposed project have also been improved to achieve the best possible results to date. The proposed project has included planning to avoid and minimize impacts to waters of the U.S.,

including wetlands, but complete avoidance is not possible. In particular, the impacts resulting from the proposed excavation areas for borrow material cannot be avoided as the current locations and geometry of these areas are a function of the requirement to meet the 1988 ROD criteria.

Pursuant to 33 CFR Section 332.3, a compensatory mitigation plan has been developed to compensate for unavoidable adverse effects to waters of the U.S. including wetlands. As a result, through the purchase of mitigation banking credits, the proposed project would not result in a net loss of aquatic function.

Based upon the above considerations in light of the requirements of EO 11990 (Protection of Wetlands) and implementing FHWA regulations (23 CFR Part 777), the FHWA has determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.

2.8.6.2 Only Practicable Alternative Finding Regarding Impacts to Floodplains

There are no practicable alternatives to the proposed action that would wholly avoid impacts to floodplains. As discussed in **FEIS Section 2.1.2** (see also **Appendix G-1**, **Section 2.3.1**), the MTIS considered improvements to the IH-35E corridor that would have had minor but unavoidable floodplain encroachments, and such alternatives were determined to be impractical in the MTIS. Among the four Build Alternatives considered in this FEIS, Alternatives 2A and 2B would result in relatively minor impacts to floodplains as compared to Alternatives 3C and 4B, and would not result in any longitudinal encroachment of floodplains. However, the FHWA finds that both Alternatives 2A and 2B would result in excessive costs as compared to other comparable toll projects, and are not practicable alternatives based primarily on the project cost, but also based on the needs and welfare of the community, economic impacts, and aesthetics.

The level of floodplain encroachment by Alternative 4B ROW (418 acres) is 121 acres (or 41 percent) greater than encroachment from Alternative 3C ROW (297 acres) (see **FEIS Section 4.14.2**). Similarly, the length of longitudinal encroachment within the floodplain of the Dallas Floodway is substantially greater for Alternative 4B (9.9 miles) than Alternative 3C (5.2 miles). The anticipated level of impacts for planned excavation areas would be the same for both alternatives (336 acres). Based on the substantially greater level of encroachment by Alternative 4B, it is clear that Alternative 3C is the least environmentally damaging alternative with respect to overall floodplain encroachment.

The relative impacts of Alternatives 3C and 4B to the natural and beneficial floodplain values listed in 23 CFR Section 650.105(i) also contribute to this explanation of all practicable measures to minimize harm to floodplains. The listing below of such floodplain values considered most relevant to the Trinity Parkway are not ranked in any order of priority but appear in the order presented in 23 CFR Section 650.105(i):

- Fish and Wildlife: The two alternatives are expected to be comparable in terms of direct impacts to wildlife populations. The effects of habitat fragmentation would be greater for Alternative 4B because it would create roadways on both sides of the Trinity River, and would therefore be more environmentally damaging than Alternative 3C. Neither alternative is expected to have an adverse impact on any threatened or endangered species.
- Vegetation and Wildlife Habitat (see **Table 2-13**, and **SDEIS Sections 4.8.2.1 page 4-111** and **4.9.2.2 page 4-114**): Alternative 3C would impact 468 acres of grassland, 21 acres of riparian forest, and 91 acres of aquatic habitat (i.e., wetlands and open water). Alternative 4B would impact 573 acres of grassland, 20 acres of riparian forest, and 111 acres of aquatic habitat. Alternative 4B would generally result in greater impacts to wildlife habitat, including 105 acres of additional grassland impacts and 20 acres more impacts to aquatic features than Alternative 3C; Alternative 4B would have one acre less impacts to riparian forest than Alternative 3C. These results indicate that Alternative 3C would clearly have fewer impacts to vegetation and habitat than Alternative 4B.
- Open Space and Natural Beauty (see **SDEIS Section 4.16 page 4-176**): Visual impact assessment determined that Alternative 4B would have a somewhat greater visual impact to the viewshed within the Dallas Floodway than Alternative 3C. The levees would partially restrict or obscure views of the surrounding areas outside of the levees, with the exception of the tall buildings in the Dallas CBD.
- Outdoor Recreation (see **SDEIS Table 4-65 page 4-309**): The impacts of Alternative 4B in terms of ROW within the Trinity River Greenbelt Park would be 93 acres greater than Alternative 3C.
- Natural Moderation of Floods (see **SDEIS Section 4.13.4 page 4-135**): Both alternatives have been designed to approximate the 1988 ROD criteria for Dallas Floodway hydraulic characteristics. However, as designed as of the SDEIS/LSS, Alternative 3C more closely meets the 1988 ROD criteria. Although not all of the 1988 ROD criteria are met, additional coordination would continue with the USACE and the City of Dallas to ensure that the design supports the flood conveyance mission of the Dallas Floodway, if a Build Alternative is selected. Iterative hydraulic modeling has been conducted to ensure that

proposed embankments are offset by excavations and other design aspects so that the project would either meet the 1988 ROD criteria or be sufficiently close to those criteria to warrant consideration of a variance. The siting of both alternatives has been modified twice over the years of project development to increase compatibility with floodway levees, and project design elements have been added to enhance the security of the floodway (e.g., addition of diaphragm walls). Where applicable, the placements of new bridge piers are aligned with existing bridge piers within floodplain areas (e.g., ramps connecting to IH-45). However, as developed as of the SDEIS/LSS, Alternative 3C performed better in terms of meeting the 1988 ROD criteria than Alternative 4B, and achieves a greater degree of hydraulic neutrality.

- Water Quality Maintenance (see **SDEIS Section 4.12, page 2-123**): Both alternatives would be subject to TPDES permit requirement and construction design to minimize construction site erosion and sedimentation. Erosion and sedimentation rates from both alternatives would be comparable, but overall erosion and sedimentation would be somewhat greater for Alternative 4B due to a construction footprint that is 126 acres larger than Alternative 3C. Accordingly, Alternative 3C is less environmentally damaging than Alternative 4B in this regard.
- Groundwater Recharge (see **FEIS Section 4.13.3.5**): Neither alternative would be expected to have appreciable impacts on groundwater recharge.

In view of the foregoing summary of impacts to floodplain natural and beneficial values, Alternative 3C would result in less adverse impacts to such values than Alternative 4B. The remainder of this section addresses measures to avoid and minimize the impacts to floodplains expected from the construction of Alternative 3C, and to comply with federal and local standards for construction within a regulatory floodway.

Central to the development of alternatives for the Trinity Parkway have been design efforts to avoid or minimize adverse impacts to the flood conveyance mission of the Dallas Floodway. The importance of flood control in the downtown Dallas area is discussed in **SDEIS Section 3.5.6,** and the design of potential floodway alternatives has focused on neutralizing hydrologic and hydraulic impacts (**SDEIS Section 4.13**). At the forefront of ensuring hydraulic neutrality for any proposed construction in the Dallas Floodway are the 1988 TREIS ROD criteria and the local government CDC process that implements those criteria. Accordingly, project design has emphasized iterative hydrologic and hydraulic modeling to minimize impacts to maximum water surface elevation and valley storage for the 100-year flood and the SPF. Most notably, the design approach includes constructing Alternative 3C above the 100-year flood elevation on embankment material that would be excavated from within the floodway to minimize hydraulic impacts. As summarized in the discussion of flood safety above (**FEIS Section 2.8.4.3**),

Alternative 3C would have minimal hydraulic impacts for both the 100-year flood and the SPF, and would not interfere with management of the floodway by either the USACE or the City of Dallas.

As discussed in **FEIS Section 1.6.5**, the construction of an alternative within a federal floodway would require authorization from the USACE under Section 408. Extensive coordination among the project partners has occurred especially in recent years to ensure that the proposed Trinity Parkway would not interrupt flood control operations or impact the existing Dallas Floodway levees. As a cooperating agency for this FEIS, this ongoing coordination has addressed anticipated construction phasing to ensure protection of the levee system, use of borrow material from the floodway for tollway embankment, and uninterrupted access for floodway operations and maintenance, flood fighting, and surveillance. The participation of the USACE in project development as evidenced in the SDEIS and LSS provide assurances that the Trinity Parkway is consistent with USACE interests relating to the Dallas Floodway.

As Alternative 3C involves modification of floodplains, the project would need to be further coordinated with FEMA prior to construction, if this alternative is selected in the anticipated ROD. This would involve receiving FEMA approval for a conditional revision to existing floodplain maps prior to construction, followed by a final revision to such maps based on as-built conditions of completed work. Coordination with FEMA has been occurring throughout the development of the proposed Trinity Parkway. The FEMA Region 6 Office participated in initial project scoping in 1999 with a request to coordinate with the local government (City of Dallas) floodplain administrator regarding a floodplain development permit (**Appendix A-1**, page 18). FEMA received copies of the DEIS, SDEIS, and LSS for review, and informal coordination with the FHWA has been ongoing. For example, on July 22, 2008, FEMA Region 6 received a preliminary draft SDEIS when representatives were briefed on the Trinity Parkway, and FEMA expressed the expectation that it would authorize conditional floodplain map revisions if a floodway alternative is selected in the anticipated ROD. Based on these and other indications from FEMA, it is expected that necessary authorization from FEMA would be received if a floodplain alternative is selected.

Based upon the above considerations in light of the requirements of EO 11988 (Floodplain Management) and implementing FHWA regulations (23 CFR Part 650, Subpart A), the FHWA has determined that there is no practicable alternative to the proposed construction in floodplains and that the proposed action conforms to applicable federal and local floodplain protection standards. In addition, as the proposed project would encroach on a regulatory floodway, the FHWA finds that the proposed action is consistent with the functioning of the Dallas Floodway and that there is sufficient evidence indicating that revisions to the floodway would be acceptable to FEMA and the City of Dallas Floodplain Administrator.

2.8.7 Conclusion

Based upon the considerations discussed above, the FHWA has determined that there is no practicable Build Alternative that would avoid all impacts to wetlands and floodplains, and that Build Alternatives 2A and 2B are not practicable alternatives under the EO practicability factors for EO 11988 (Protection of Wetlands) and EO 11990 (Floodplain Management). The FHWA has further determined that Alternatives 3C and 4B are both practicable, but that Alternative 3C would result in less adverse impacts than Alternative 4B to both wetlands and the natural and beneficial values of floodplains. The FHWA finds that the proposed Build Alternative 3C includes all practicable measures to minimize harm to wetlands and floodplains appropriate for the schematic level of project design.

The FHWA's decision to recommend Alternative 3C for further evaluation is based on a unique set of factors that warrant favoring an alternative with significant and longitudinal encroachments of the Dallas Floodway, even though general FHWA policy (i.e., 23 CFR Part 650) would not favor such an alternative. These factors relate to the risks of constructing a roadway longitudinally within a floodplain and community support for such roadway, discussed in the SDEIS and further developed in the LSS, which have been referenced in the discussion above and are summarized in the list below:

- First, the proposed project has been designed to avoid any substantial impacts to the ability of the Dallas Floodway to perform its fundamental mission of safely conveying floodwaters from extreme storm events past the Dallas CBD. The design approach has been to construct the embankment for the Trinity Parkway from material excavated in the floodplain, thereby resulting in a hydraulically neutral facility. The excavation areas within the Dallas Floodway have been selected based on iterative hydraulic modeling in coordination with the USACE of future conditions affecting the movement of water across the broad, nearly level floodplain that is flanked by levees. Also, the nature of this alternative's longitudinal encroachment actually facilitates hydraulic neutrality by its location near the base of a floodway levee and parallel with it. Although preliminary modeling reported in the SDEIS does not report perfect solutions, the designed facility is expected to closely approximate the existing ability of the Dallas Floodway to convey floodwaters. At this point in project development, it is clear that the design is sufficiently close to meeting the TREIS 1988 ROD criteria to warrant consideration of a variance from the USACE Fort Worth District Commander.

- Second, Alternative 3C is designed to protect the roadway from any substantial harm from floodwaters passing through the Dallas Floodway. Most importantly, the planned roadway would be elevated on embankment with security walls or protected by flood separation walls that would remove it from the 100-year floodplain with approximately 2 feet of freeboard. Thus, the proposed project would only be inundated by floods with a frequency of occurrence substantially more rare than one percent per year. Floodwaters move through the Dallas Floodway at relatively slow velocities, and the rare flood event that would overtop the embankment would inundate the roadway but would not be expected to cause substantial damage to it (see **FEIS Appendix F-2**). Such rare events would result in the closure of the facility prior to its inundation and throughout a flooding event, and thereafter while debris is removed. Such anticipated closures and maintenance of the roadway are considered acceptable risks to project sponsors in light of the benefits of creating a roadway that would substantially assist in managing the severe traffic congestion in and near the Dallas CBD.
- Third, the concept of placing a longitudinal roadway in the Dallas Floodway has been a prominent aspect of City of Dallas planning for over four decades. Support from municipal leaders and the community in general has endured the scrutiny this alternative has received over a long period of time. Noteworthy in the history of project development are milestones such as the Stemmons deed in 1972, various city planning documents in the 1960s and 1970s, voter approval of bonds in 1998 for a Trinity Parkway reliever route, and the special election in 2007 that affirmed the continued consideration of floodway alternatives for the Trinity Parkway (see **FEIS Section 1.1.2**). The combination of the need for a reliever route to manage local traffic congestion, the absence of practicable alternatives outside the floodplain, and the general affirmation of longitudinal encroachment by elected leaders and the community in general are important considerations in FHWA's recommendation of a floodway alternative.

With regard to authorizing an exception to policy regarding significant and/or longitudinal encroachments of floodplains (i.e., 23 CFR Part 650A), the FHWA has delegated this decision to the Division Administrator of FHWA field offices. Under 23 CFR Section 1.32(b), the FHWA authorizes a "delegated representative" of the FHWA Administrator to issue directives relating agency policy or procedures. The specific delegation of authority relating to floodplain policy was issued under FHWA Order M1100.1A (Change 45, November 25, 2005). This document includes the following relevant provision: "Division Administrators are delegated the authority to make findings that highway encroachments on a flood plain are the only practicable alternative location, as outlined in" 23 CFR Part 650A (FHWA Delegations and Organization Manual: Part 1—Delegations of Authority, Chapter 5—Federal-Aid, Paragraph 20—Authorizations to Proceed, Subparagraph 20(l)).

2.9 RECOMMENDED ALTERNATIVE

After taking into consideration all direct, indirect, and cumulative impacts as presented in the SDEIS and/or LSS, and as additionally communicated in the EO practicability analysis presented in **FEIS Section 2.8** above, Alternative 3C has been identified as the FHWA-recommended alternative. Accordingly, the remaining sections of **FEIS Chapter 2** focus solely on the design characteristics of Alternative 3C, which is the only Build Alternative carried forward for analysis throughout the remaining chapters of this FEIS.

2.9.1 Alternative 3C Design Refinements

Since the FHWA designated Alternative 3C its recommended alternative, the design of Alternative 3C has been further refined as to ensure engineering functionality with adjacent major interchanges at the proposed project's northern and southern project termini. These design refinements have been necessitated because of interim developments affecting other transportation projects that would alter these interchanges. **FEIS Sections 2.9.1.1** and **2.9.1.2** present details relating to the transition of the Trinity Parkway with these adjacent major interchanges. The design refinements necessitated expansion of the northern portion of the project area due to the deferral of Project Pegasus, as discussed in **FEIS Section 1.1.1**. Additionally, portions of the original Trinity Parkway engineering design at the southern end of the project area have been incorporated into the independent SM Wright project (see **FEIS Section 1.1.2**), thereby necessitating adjustments to the design of Alternative 3C and minor alterations to the project area. The same general refinements to the design for Alternative 3C to accommodate transition requirements at both project termini would also be required for Alternatives 2A, 2B, and 4B; therefore, this modification to project design would not be a basis for distinguishing among the alternatives under consideration.

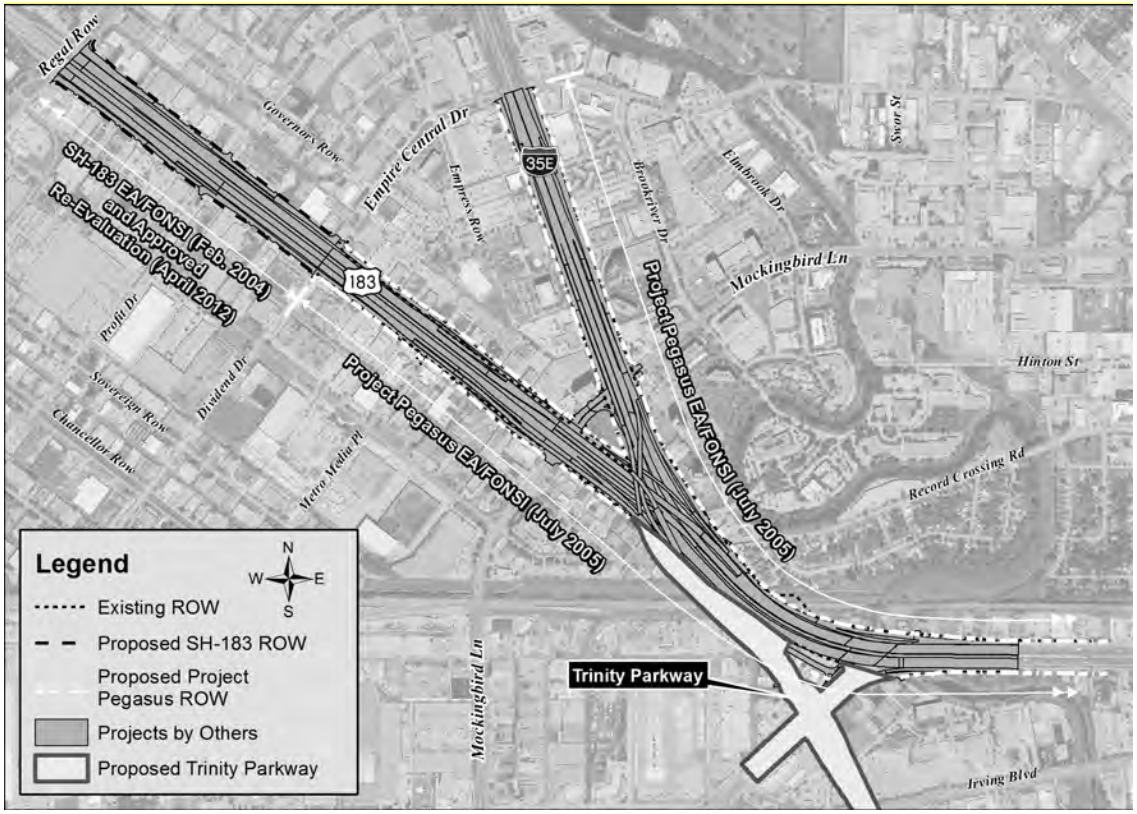
The information provided in **FEIS Chapter 3** reflects the project area as modified to accommodate the Project Pegasus and SM Wright planning developments noted above. Also, the updated discussion of all aspects of Alternative 3C throughout the remainder of this FEIS is based on the new ROW footprint and redesigned schematic for Alternative 3C, which are shown in **FEIS Plates 2-8** and **2-9**. Engineering refinements to the design of Alternative 3C in general and within the Dallas Floodway are described in **FEIS Section 2.9.1.3**, and a discussion of updated access considerations regarding Alternative 3C is in **FEIS Section 2.9.1.4**. In light of the importance of project cost estimates for the EO practicability analysis (see **FEIS Section 2.8.4.1**), **FEIS Section 2.9.1.5** includes an updated examination of the expected construction and

ROW/utility relocation costs for Alternative 3C. Such costs have been adjusted to 2011 dollars to determine whether Alternative 3C, as redesigned, would alter the EO practicability conclusion in **FEIS Section 2.8.7**; similar updating of the 404 practicability analysis in **FEIS Appendix G-1** was also completed.

2.9.1.1 Northern Terminus Transition Area

The Trinity Parkway's northern terminus is the IH-35E (Stemmons Freeway)/SH-183 interchange. As previously discussed in **FEIS Section 2.1.2**, the footprint of Project Pegasus originally adjoined the Trinity Parkway's northern terminus. However, this project was deferred in *Mobility 2035 – 2013 Update,* due to lack of funding. As shown in **Figure 2-23**, Project Pegasus was not only adjacent to the Trinity Parkway (at the IH-35E/SH-183 interchange), but it was also adjacent to the proposed SH-183 improvements (on SH-183 at Empire Central).

FIGURE 2-23. TRINITY PARKWAY AND PROJECT PEGASUS



The deferral of Project Pegasus creates a non-tolled gap between the SH-183 improvements (by others), which include concurrent flow managed HOV lanes, and the proposed Trinity Parkway tollroad. Additionally, without Project Pegasus, the Trinity Parkway alignment must transition onto existing IH-35E (Stemmons Freeway). In response, the engineering design of the FHWA-

recommended alternative (Alternative 3C) was necessarily modified to accommodate the transition of the Trinity Parkway onto IH-35E (Stemmons Freeway) and SH-183. The modified roadway design of the proposed project through this transition area is shown in **FEIS Plates 2-8A** and **2-9** (see **Sheets 1 - 4**) and is described further below.

IH-35E (Stemmons Freeway)

In order to make room for the two direct connecting ramps connecting northbound Trinity Parkway to northbound IH-35E and southbound IH-35E to southbound Trinity Parkway, while also maintaining reasonable existing access, the proposed project would reconstruct IH-35E from south of Mockingbird Lane to north of Empire Central Drive. This mainlane reconstruction would include the reconstruction of the Mockingbird Lane and Empire Central Drive overpasses to better facilitate local street access through this heavily congested area. Likewise, the proposed project would also include intersection improvements at Commonwealth Drive and IH-35E to better facilitate local access and congestion. The proposed mainlane configuration of IH-35E consists of three lanes in each direction, with an additional auxiliary lane located between Empire Central Drive and Regal Row. The reconstruction of a portion of the northbound IH-35E frontage road between Mockingbird Lane and Empire Central Drive would also be required.

In addition to the aforementioned reconstruction, the proposed project would also construct six ramps along IH-35E: three in the northbound direction and three in the southbound direction. These six ramps consist of the following: 1) a northbound entrance ramp from Mockingbird Lane, 2) a northbound exit ramp to Empire Central Drive, 3) a northbound entrance ramp from Empire Central Drive, 4) a southbound exit ramp to Empire Central Drive, 5) a southbound exit ramp to Mockingbird Lane, and 6) a southbound entrance ramp from Mockingbird Lane. The proposed ramps in the Trinity Parkway design refinements for this transition area are consistent with the previously approved Project Pegasus schematics.

SH-183

Similar to IH-35E, to make room for the four direct connecting ramps connecting Trinity Parkway and the SH-183 general purpose lanes and managed lanes, the SH-183 mainlanes and frontage roads would be reconstructed from IH-35E to Empire Central Drive. This design change is also necessary to bridge the gap left by the deferral of Project Pegasus from the *Mobility 2035 – 2013 Update*. At Empire Central Drive, the proposed project would match the ultimate build out of the SH-183 project by TxDOT (CSJ: 0094-03-065). Mockingbird Lane at SH-183 would be widened to accommodate improved local access between SH-183 and IH-35E.

The SH-183 general purpose lanes would consist of three lanes in each direction with two auxiliary lanes in each direction west of the Trinity Parkway direct connections. To the east of the Trinity Parkway direct connections, SH-183 merges with IH-35E and would be reconstructed to improve existing merging movements. Additionally, the proposed project would construct a westbound exit ramp to Mockingbird Lane, a westbound exit ramp to Empire Central Drive, and an eastbound entrance ramp from Empire Central Drive.

2.9.1.2 Southern Terminus Transition Area

The southern terminus for the proposed Trinity Parkway is the US-175/SH-310 interchange. Between IH-45 and US-175/SH-310, the proposed Trinity Parkway overlaps with the proposed SM Wright Project (TxDOT CSJs: 0092-01-052, 0197-02-108 and 0092-14-081) that is being processed separately by TxDOT. In 2009, subsequent to the publication of the SDEIS, the southbound IH-45 to southbound US-175 DC ramp and the northbound US-175 to northbound IH-45 DC ramp, which were originally proposed to be constructed as part of the Trinity Parkway, were instead incorporated into the Phase I portion of the SM Wright Project. The SM Wright Project is proposed to be constructed in two phases: Phase I includes the construction of the DC ramps discussed above and associated improvements along IH-45, along with construction/extension of the CF Hawn Freeway portion of US-175 from Bexar Street to IH-45; Phase II includes the downsizing of the SM Wright Freeway.

Because construction of the SM Wright Project is planned to occur before construction of the proposed Trinity Parkway, design plans for the recommended alternative (Alternative 3C) have been refined to accommodate the Trinity Parkway's transition with improvements to IH-45 and US-175 that are proposed as part of the SM Wright Project. As shown in **FEIS Plates 2-8B** and **2-9** (see **Sheets 17 - 19**), these design refinements to the Trinity Parkway include the re-striping of the US-175 mainlanes beginning at Lamar Street and extending just east of Bexar Street, as well as the re-striping of IH-45 mainlanes, as to best facilitate compatible lane transitions between the two proposed projects.

2.9.1.3 Engineering Considerations

An overview of the design refinements (i.e., schematics and typical cross sections) to the FHWA-recommended Build Alternative 3C is provided in **FEIS Plate 2-8** (**Sheets A-D**). A detailed plan view of the paving outline, bridges, ROW limits, and other design features overlain on an aerial photograph is shown in **FEIS Plate 2-9** (**Sheets 1 – 19**). Alternative 3C would be approximately 8.79 miles in length, would require approximately 559 acres of ROW (reflects additional ROW needed for the transition with IH-35E and SH-183 at the northern terminus as discussed in **FEIS**

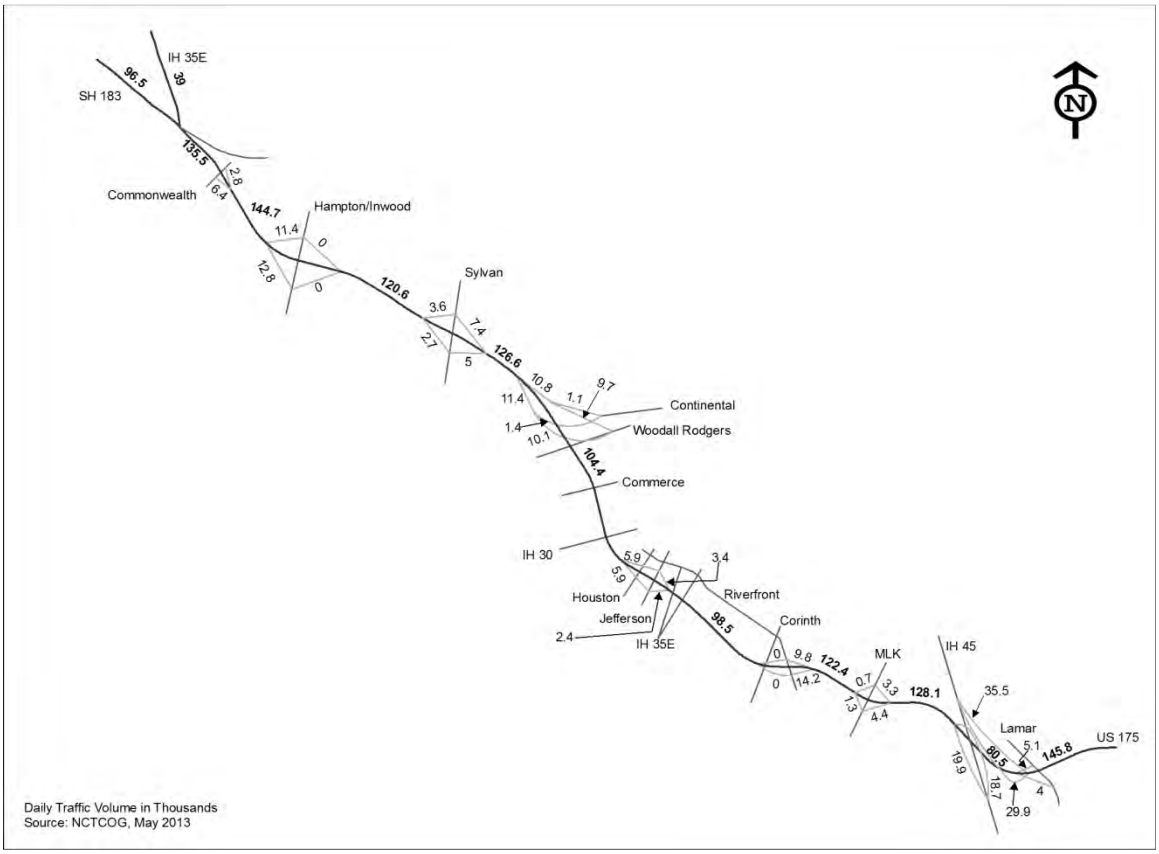
Section 2.9.1), and would cost approximately $1.31 billion (2013 dollars) to construct. The construction and ROW cost estimates for Build Alternative 3C and cost participation by involved agencies are discussed in **FEIS Chapter 6** and the updated cost estimate for Alternative 3C is in **FEIS Appendix D**. Major interchanges associated with design refinements for Alternative 3C would include the following:

- Direct connections at the IH-35E(Lower Stemmons)/SH-183 interchange (northern terminus), the US-175/SH-310 interchange (southern terminus), Woodall Rodgers Freeway (north side only), and IH-45;
- Full diamond interchanges at Hampton/Inwood Road, Sylvan/Wycliff Avenue, the proposed Jefferson Memorial Bridge (project by others) (see **FEIS Section 2.7.1** for details), Corinth Street, and MLK;
- Half diamond interchanges at Commonwealth Drive, Continental Avenue, and Lamar Street, and SH-310; and
- Connection to IH-35E (South R.L. Thornton Freeway) via the proposed Jefferson Memorial Bridge (project by others).

Design refinements for Build Alternative 3C include the development of greater design details for the portion of the toll road within the Dallas Floodway. As discussed further in **FEIS Section 2.9.1.5**, design refinements have resulted in a substantial reduction in the cost of constructing the project.

Information regarding forecasted for the 2035 average weekday volumes for Alternative 3C were updated in accordance with the *Mobility 2035 – 2013 Update*. The estimated traffic volumes shown in **Figure 2-24** assumed a use rate commensurate with other toll roads in the NTTA system (see **FEIS Section 1.3.4.1** for other modeling assumptions).

FIGURE 2-24. ESTIMATED 2035 AVERAGE WEEKDAY VOLUMES – ALTERNATIVE 3C



2.9.1.4 Access Considerations

Access to IH-35E (South R.L. Thornton Freeway)

This section supplements information provided above in **FEIS Section 2.5.1** about access to IH-35E (South R.L. Thornton Freeway). Subsequent to the publication of the SDEIS in 2009, plans have been advanced by TxDOT Dallas District for a proposed Jefferson Memorial Bridge (CSJ: 0918-47-018). The schematic plans for Alternative 3C have been updated accordingly to accommodate the proposed Jefferson Memorial Bridge. This new bridge would be located just south and parallel to the existing Jefferson Street Bridge, which would be removed upon completion of the new bridge. The new bridge would provide for two-way traffic and would connect to IH-35E (South R.L. Thornton Freeway). Since the existing Jefferson Street Bridge will be removed, and to avoid impacts to the Houston Street Bridge, the Alternative 3C alignment was modified to pass under the existing Houston Street Bridge and connect with the proposed Jefferson Memorial Bridge (via a full diamond interchange). This connection of the Trinity Parkway to the proposed Jefferson Memorial Bridge would provide motorists connections to and from IH-35E (South R.L. Thornton Freeway).

Other Interchange Access Locations

Design refinements to Alternative 3C would alter several of the interchange access connections described above in **FEIS Section 2.5.2**. The interchanges affected are shown in **Table 2-18**, which reflects the interchange access information from **Table 2-6** and the changed access information for the current design of Alternative 3C. Another modification of **Table 2-6** is with reference to the half-diamond interchange at SH-310, which is now part of the design for the SM Wright project (by TxDOT); this design refinement has been incorporated into the updated Alternative 3C schematic plans.

TABLE 2-18. INTERCHANGE ACCESS CHANGES FOR ALTERNATIVE 3C

Interchange Location	Trinity Parkway Alternative 3C	
	Access Configuration from SDEIS (see **SDEIS Table 2-6** or **FEIS Table 2-6**)	**Changed Access Configuration**
At Woodall Rodgers (WR) / Margaret Hunt Hill Bridge	Direct Connections SB-EB and WB-EB	Direct Connections via Ramps EB TP – NB WR; SB WR – WB TP
At Houston/Jefferson Street	Full Diamond Interchange	Full Diamond Interchange at Proposed Jefferson Memorial Bridge [1]
At IH-35E (South R.L. Thornton Freeway)	Connection via Ramps NB-WB and EB-SB	Connection via the Proposed Jefferson Memorial Bridge [1]
At Corinth Street	Half Diamond Interchange	T-Intersection with Full Diamond Interchange [2]

Notes: NB = Northbound; SB = Southbound; WB = Westbound; EB = Eastbound; TP = Trinity Parkway; WR = Woodall Rodgers

1. Connection to IH-35E (South R.L. Thornton Freeway) via the proposed Jefferson Memorial Bridge (project by others) is a design refinement that resulted from the updating/further refining of the Alternative 3C schematic plans.
2. The T-Intersection design involves extending Riverfront Boulevard to the southeast approximately 1,000 feet from the Riverfront/Corinth intersection and terminating at a T-Intersection with diamond ramps at the Trinity River East Levee. This design would avoid any ramp connections to the Corinth Street Viaduct, and therefore, potentially allow better traffic channelization on a new structure.

Design Speed and Vehicular Park Access

This section supplements information provided above in **FEIS Section 2.5.3** about access to park and recreation facilities. Subsequent to the publication of the SDEIS, the City of Dallas continued to move forward with improvements to both the Cedar Crest/MLK, Jr. Bridge and at the Sylvan Avenue Dallas Floodway crossing. For the Cedar Crest/MLK, Jr. Bridge, the City of Dallas has proposed to construct parking and trail elements that would provide park access over the West Levee of the Trinity River, which would eliminate the need for a structural ramp. These improvements would be constructed to have connectivity to the planned bike/pedestrian and gateway improvements planned by the City of Dallas to the Cedar Crest Bridge. NTTA and the City of Dallas agreed that once the Trinity Parkway bond funds allotted for the City of Dallas

proposed parking and trail elements were expended, the programmed access ramp improvements for the Trinity Parkway at Cedar Crest/MLK, Jr. Bridge (East Levee) will have been met and that no other park access improvements will be required at this location (see **FEIS Appendix A-2**, Pages 64-65).

Similarly, park access at Sylvan Avenue is being completed by others (TxDOT and City of Dallas) as part of the Sylvan Avenue Bridge Project. This project, which is currently under construction, will construct a new elevated bridge over the Trinity River and provide roadway access to Trammell Crow Park in the Dallas Floodway. As agreed upon by project sponsors, Trinity Parkway funds have been applied to the construction cost of this park access ramp, thereby meeting the need for the programmed access ramp improvements for the Trinity Parkway at Sylvan Avenue. The three park access locations to be constructed as part of the Trinity Parkway are shown in relation to Alternative 3C on **FEIS Plate 2-9**. After construction, these park access facilities would be maintained by the City of Dallas (Hampton Road, proposed Jefferson Memorial Bridge, and Corinth Street/Riverfront Boulevard), as well as the Sylvan Avenue Bridge park access location (by others). The Cedar Crest/MLK Bridge improvements (by others) are still under design.

Federal Approval for Access to Interstate System

As noted above in **FEIS Section 2.5.5**, approval from the FHWA would be required for Trinity Parkway to have access to the federal Interstate Highway System. The NTTA has developed appropriate documentation for the FHWA-recommended alternative (Alternative 3C) and is in the process of coordinating with TxDOT and the FHWA to request access for interchange locations at IH-35E (Lower Stemmons Freeway) at the northern project terminus, as well as IH-45 in the southern segment. In addition to these two access points, it should be noted that the proposed Trinity Parkway would provide access to IH-35E (South R.L. Thornton Freeway) via a connection with the future Jefferson Memorial Bridge being advanced as an independent project by TxDOT. The request for Interstate access to IH-35E (South R.L. Thornton Freeway) would be handled separately by others as part of the schematic design development phase for the Jefferson Memorial Bridge.

2.9.1.5 Design Refinements and EO Practicability

As Build Alternative 3C is the only practicable alternative based on the EO practicability screening analysis above, all references to project characteristics and impacts throughout the remainder of this analysis apply only to Build Alternative 3C. Moreover, the NTTA has developed the design of Build Alternative 3C to a higher level of detail since the LSS and has generally updated the

information regarding the expected environmental impacts of this alternative. The updated impacts for the refined design of Build Alternative 3C are likewise reflected throughout the remainder of this analysis pursuant to the Section 404(b)(1) Guidelines.

In light of the importance of project cost estimates for the 404 practicability analysis, the revised cost estimate based on design refinements for Alternative 3C led to an update of the cost factor. This look back to the 404 practicability analysis was done to determine how Alternative 3C, as redesigned, would compare to the 2011 cost estimate. Project costs from 2013 were adjusted to 2011 dollars and are shown in **Table 2-19** to facilitate comparison with cost data from **Tables 2-9** and **2-11**. These data indicate that the updated design for Alternative 3C results in construction costs and ROW/utility relocation costs that are less than the cost screen discussed above. Further analysis was completed to ascertain the major elements of costs considered that would account for the large reduction in overall cost (i.e., approximately $146M). The greatest cost reduction for Alternative 3C is the result of a greatly reduced volume of earth excavation and embankment fill, which produced a $67M reduction in cost. This design change is linked to the decision to not have the Trinity Parkway place fill on the East Levee sideslope adjacent the roadway embankment, as this step is no longer needed to facilitate the raising of the levee. Construction cost reductions related to various structures resulted in a net saving of approximately $19M. Although the cost estimates for various types of wall structures (i.e., security, flood separation, diaphragm, slurry, and retaining walls) would add $90M above the 2011 estimate, cost reductions in redesigned mainlane, ramp, and other bridges amounting to $108M would more than offset that increase. Other design changes that produced substantial reductions in construction cost components included costs for drainage (-$9M), traffic barriers (-$6M), and traffic control (-$19M).

TABLE 2-19. COST SCREEN APPLIED TO ALTERNATIVE 3C DESIGN CHANGES

Project Cost Estimate (all costs in 2011 dollars)	**Trinity Parkway Alternatives**	
	3C-LSS (old)	**3C-FEIS (new)**
Project Length (mainlane miles)	*52.8*	*52.8*
Construction Cost Total in $ millions (M) ($M/mainlane mile)	1,014 (19.2)	867 (16.4)
ROW/Utility Relocation Cost Total in $M ($M/mainlane mile)	142 (2.7)	146 (2.8)
Combined Above Costs in $M ($M/mainlane mile)	**1,156 (21.9)**	**1,013 (19.2)**
Cost Screen for Construction and ROW/Utility Relocation Costs in $M/mainlane mile	20.0	20.0
Difference Between Alternative Cost Estimate and Cost Screen in $M/mainlane mile	1.9	-0.8
Percent Difference Between Alternative Cost Estimate and Cost Screen	**10%**	**-4%**

[END OF CHAPTER EXCEPT FOR PLATES]

PLATE 2 - 1

SDEIS/LSS BUILD ALTERNATIVES ON AERIAL PHOTOGRAPH

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

PROJECT AREA BOUNDARY

Legend

- Alternative 2A - Irving/Riverfront Boulevard (Elevated)
- Alternative 2B - Irving/Riverfront Boulevard (At-Grade)
- Alternative 3C - Combined Parkway - Riverside (Further Modified)
- Alternative 4B - Split Parkway - Riverside (Modified)

All ROW footprints for the Trinity Parkway build alternatives reflect the schematic design considered during the preparation of the SDEIS (2009) and LSS (2012).

N

0 3,000 6,000 9,000
SCALE IN FEET

0 900 1,800 2,700
SCALE IN METERS

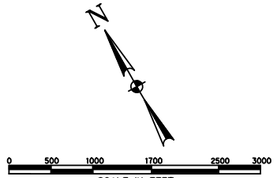
Note: Locations are approximate. Alignments are shown adjacent to one another for graphic clarity. Detailed alignments for each alternative have been presented earlier as part of Chapter 2. Year of Aerial Photograph Date: 2012.

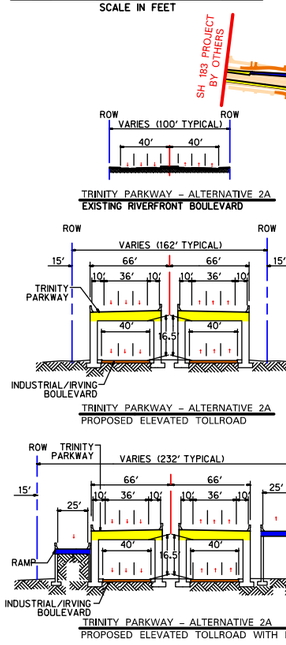
Reference Section 2.3.2

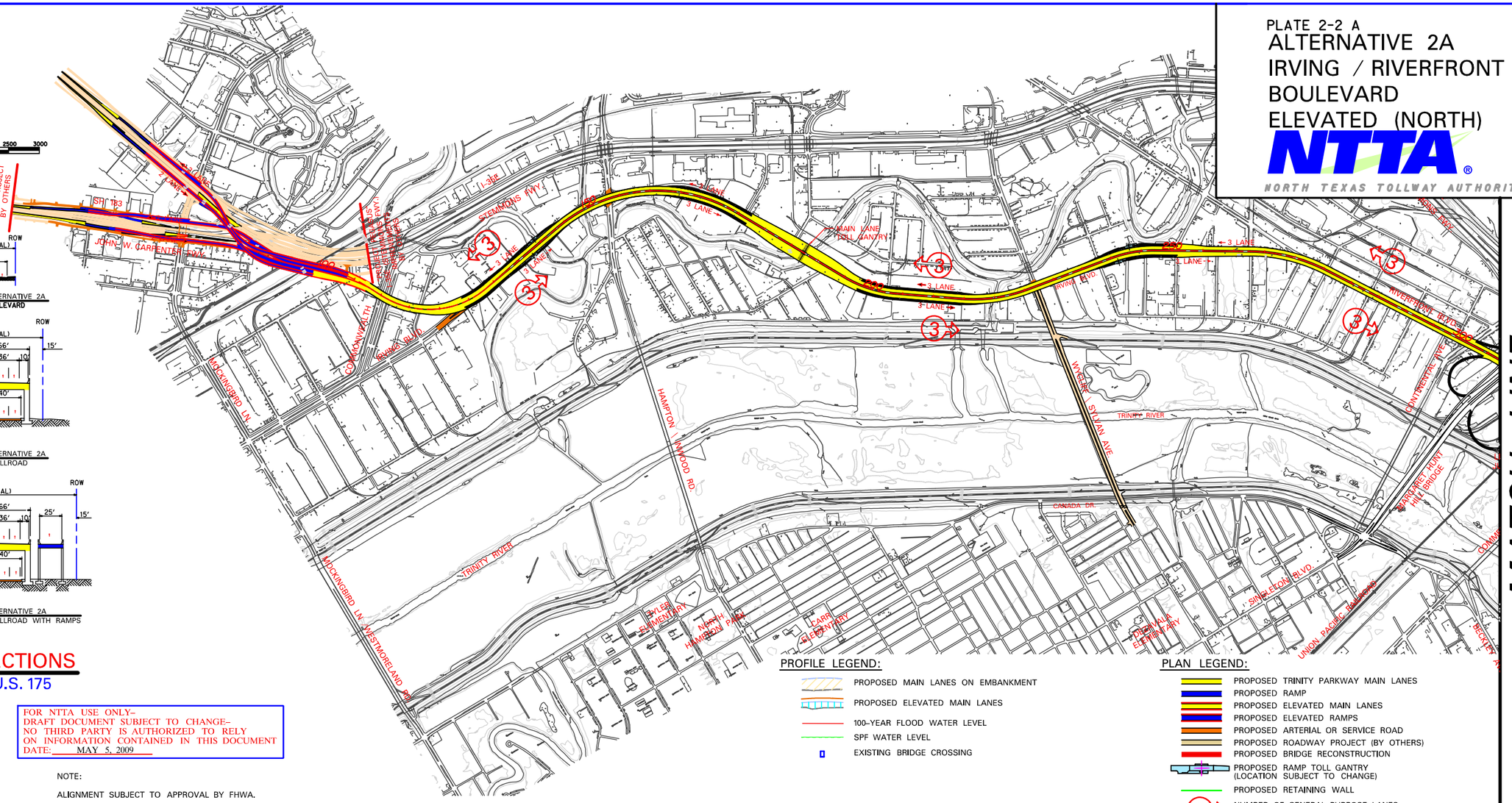
PLATE 2-2 A

ALTERNATIVE 2A
IRVING / RIVERFRONT BOULEVARD
ELEVATED (NORTH)

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



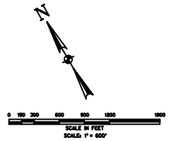




MATCH LINE

TYPICAL SECTIONS

I–35E TO U.S. 175



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DRAFT DOCUMENT SUBJECT TO CHANGE–
NO THIRD PARTY IS AUTHORIZED TO RELY
ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: MAY 5, 2009

NOTE:

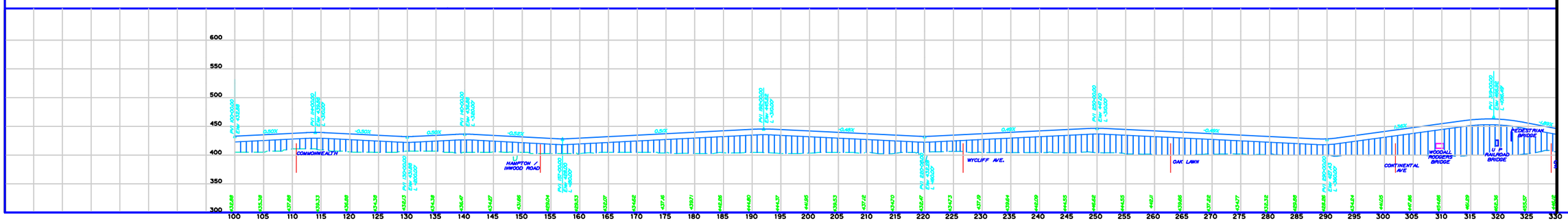
ALIGNMENT SUBJECT TO APPROVAL BY FHWA.

PROFILE LEGEND:

- PROPOSED MAIN LANES ON EMBANKMENT
- PROPOSED ELEVATED MAIN LANES
- 100-YEAR FLOOD WATER LEVEL
- SPF WATER LEVEL
- EXISTING BRIDGE CROSSING

PLAN LEGEND:

- PROPOSED TRINITY PARKWAY MAIN LANES
- PROPOSED RAMP
- PROPOSED ELEVATED MAIN LANES
- PROPOSED ELEVATED RAMPS
- PROPOSED ARTERIAL OR SERVICE ROAD
- PROPOSED ROADWAY PROJECT (BY OTHERS)
- PROPOSED BRIDGE RECONSTRUCTION
- PROPOSED RAMP TOLL GANTRY (LOCATION SUBJECT TO CHANGE)
- PROPOSED RETAINING WALL
- 3 NUMBER OF GENERAL PURPOSE LANES ALONG INDICATED MAIN LANE DIRECTION



V7 826-PP2A-S.DGN

PLATE 2-2 B

ALTERNATIVE 2A
IRVING / RIVERFRONT BOULEVARD
ELEVATED (SOUTH)

NTTA® NORTH TEXAS TOLLWAY AUTHORITY

MATCH LINE

PROFILE LEGEND:

- PROPOSED MAIN LANES ON EMBANKMENT
- PROPOSED ELEVATED MAIN LANES
- 100-YEAR FLOOD WATER LEVEL
- SPF WATER LEVEL
- EXISTING BRIDGE CROSSING

PLAN LEGEND:

- PROPOSED TRINITY PARKWAY MAIN LANES
- PROPOSED RAMP
- PROPOSED ELEVATED MAIN LANES
- PROPOSED ELEVATED RAMPS
- PROPOSED ARTERIAL OR SERVICE ROAD
- PROPOSED ROADWAY PROJECT (BY OTHERS)
- PROPOSED BRIDGE RECONSTRUCTION
- PROPOSED RAMP TOLL GANTRY (LOCATION SUBJECT TO CHANGE)
- PROPOSED RETAINING WALL
- NUMBER OF GENERAL PURPOSE LANES ALONG INDICATED MAIN LANE DIRECTION

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DATE: MAY 5, 2009

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1. ALIGNMENT SUBJECT TO APPROVAL BY FHWA.

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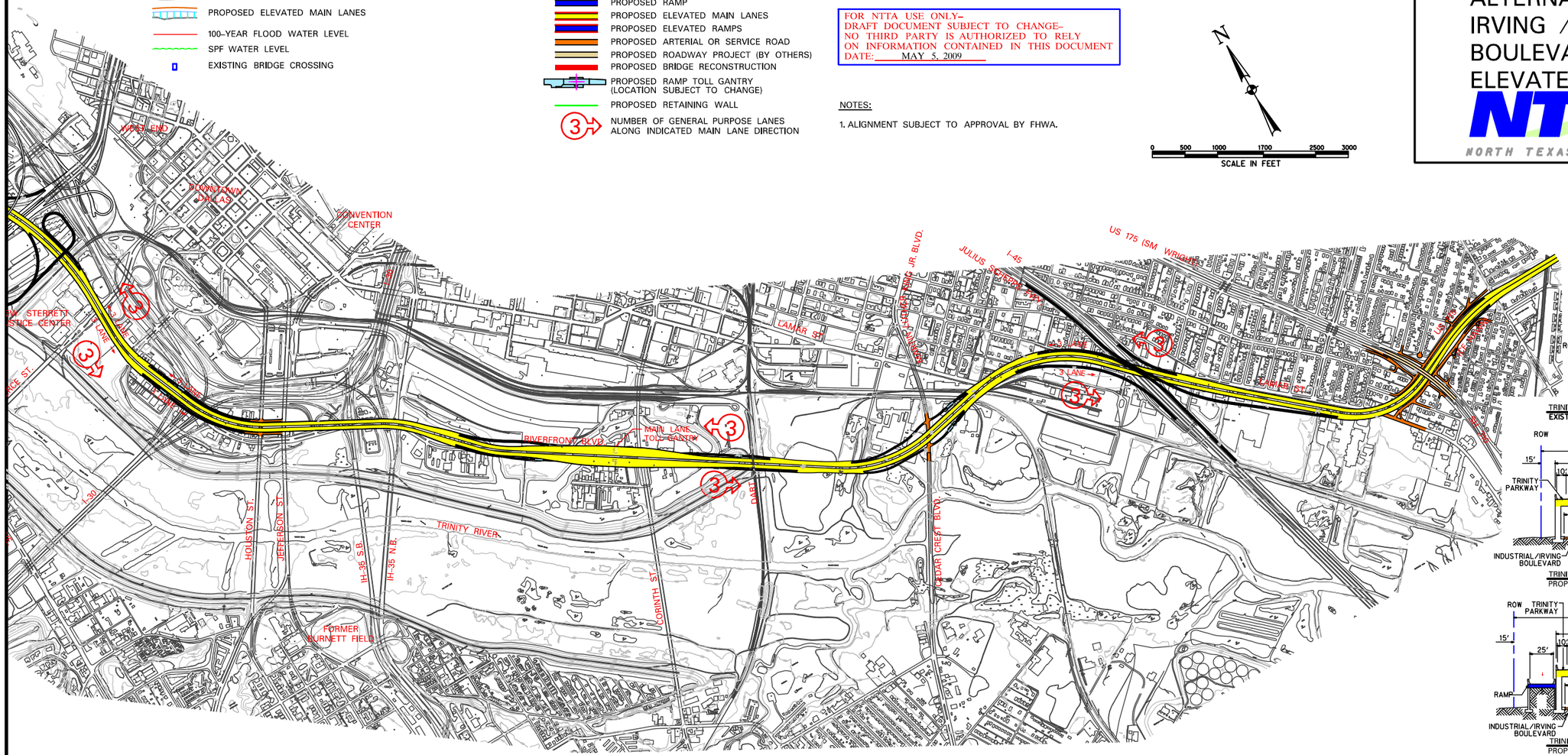
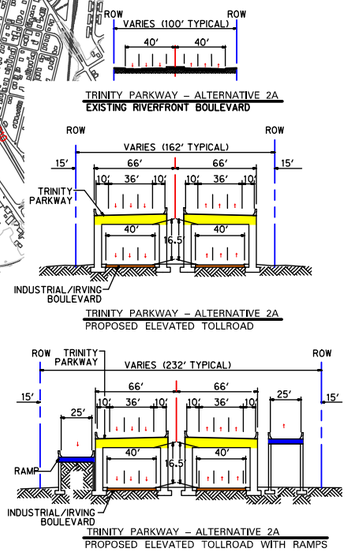




TYPICAL SECTIONS
I–35E TO U.S. 175

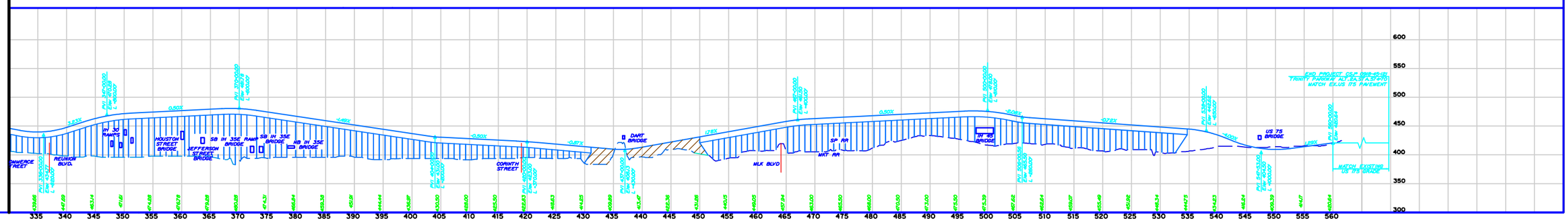
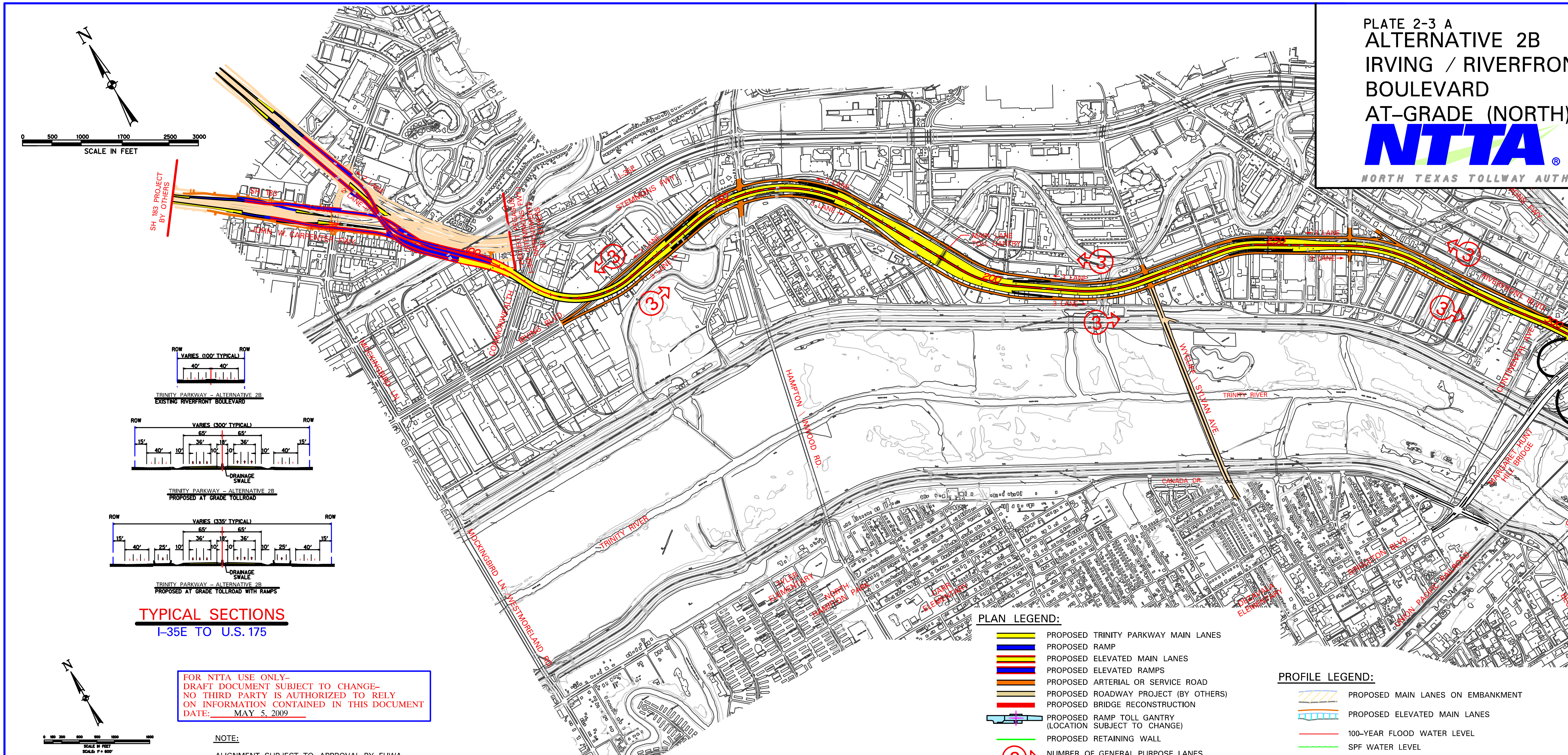


PLATE 2-3 A

ALTERNATIVE 2B IRVING / RIVERFRONT BOULEVARD AT-GRADE (NORTH)

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



TYPICAL SECTIONS

I–35E TO U.S. 175

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ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: MAY 5, 2009

NOTE:

ALIGNMENT SUBJECT TO APPROVAL BY FHWA.

PLAN LEGEND:

- PROPOSED TRINITY PARKWAY MAIN LANES
- PROPOSED RAMP
- PROPOSED ELEVATED MAIN LANES
- PROPOSED ELEVATED RAMPS
- PROPOSED ARTERIAL OR SERVICE ROAD
- PROPOSED ROADWAY PROJECT (BY OTHERS)
- PROPOSED BRIDGE RECONSTRUCTION
- PROPOSED RAMP TOLL GANTRY (LOCATION SUBJECT TO CHANGE)
- PROPOSED RETAINING WALL
- NUMBER OF GENERAL PURPOSE LANES ALONG INDICATED MAIN LANE DIRECTION

PROFILE LEGEND:

- PROPOSED MAIN LANES ON EMBANKMENT
- PROPOSED ELEVATED MAIN LANES
- 100–YEAR FLOOD WATER LEVEL
- SPF WATER LEVEL
- EXISTING BRIDGE CROSSING

MATCH LINE

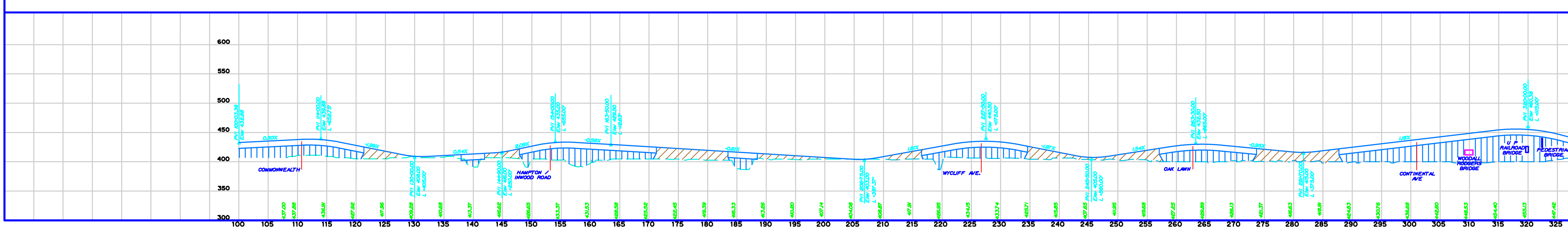

PLATE 2-3 B
ALTERNATIVE 2B
IRVING / RIVERFRONT BOULEVARD
AT-GRADE (SOUTH)

NTTA® NORTH TEXAS TOLLWAY AUTHORITY

MATCH LINE

PLAN LEGEND:

- PROPOSED TRINITY PARKWAY MAIN LANES
- PROPOSED RAMP
- PROPOSED ELEVATED MAIN LANES
- PROPOSED ELEVATED RAMPS
- PROPOSED ARTERIAL OR SERVICE ROAD
- PROPOSED ROADWAY PROJECT (BY OTHERS)
- PROPOSED BRIDGE RECONSTRUCTION
- PROPOSED RAMP TOLL GANTRY (LOCATION SUBJECT TO CHANGE)
- PROPOSED RETAINING WALL
- NUMBER OF GENERAL PURPOSE LANES ALONG INDICATED MAIN LANE DIRECTION

PROFILE LEGEND:

- PROPOSED MAIN LANES ON EMBANKMENT
- PROPOSED ELEVATED MAIN LANES
- 100-YEAR FLOOD WATER LEVEL
- SPF WATER LEVEL
- EXISTING BRIDGE CROSSING

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DATE: MAY 5, 2009

NOTES:

1. ALIGNMENT SUBJECT TO APPROVAL BY FHWA.

N

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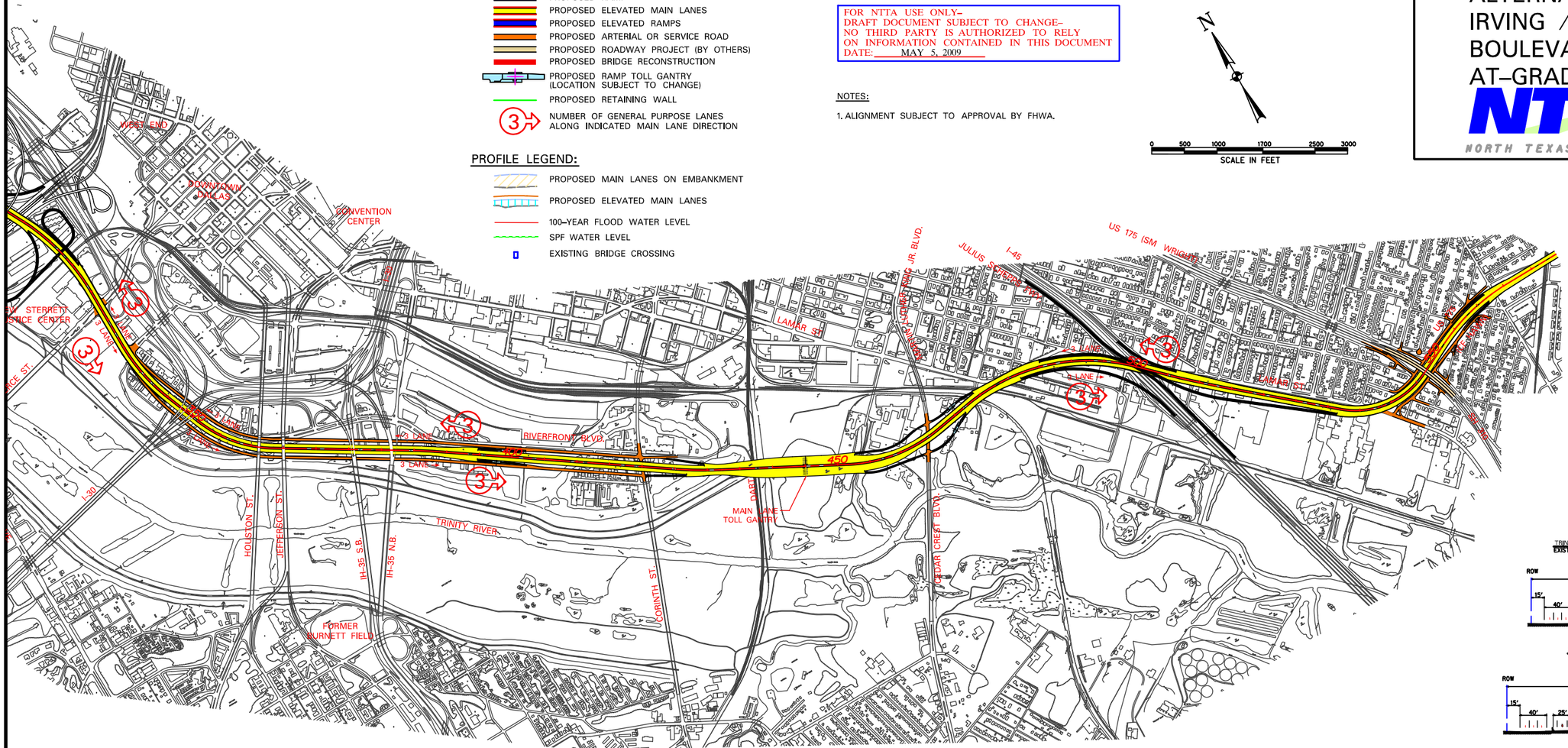
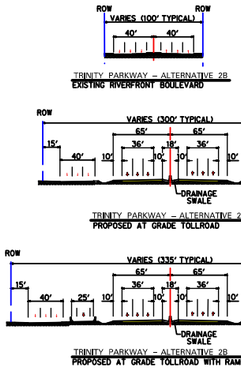
SCALE IN FEET





TYPICAL SECTIONS
I-35E TO U.S. 175

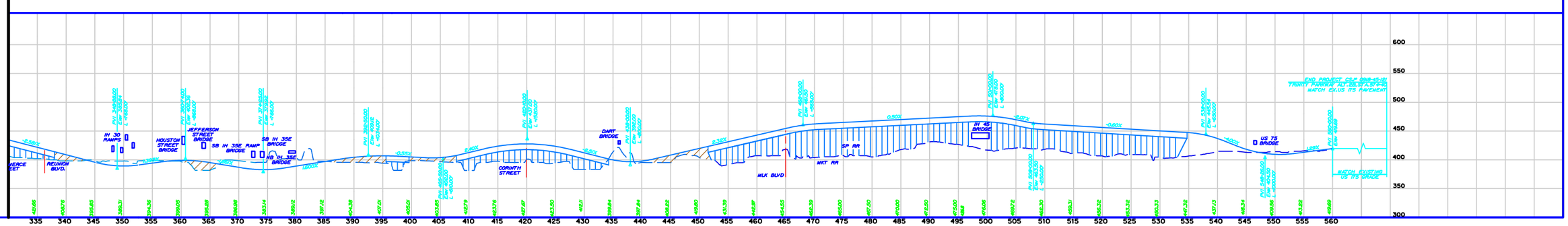
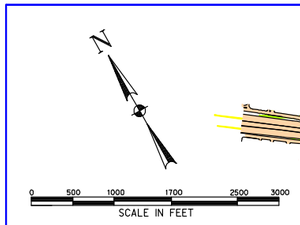


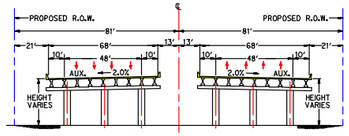
PLATE 2-4 A

ALTERNATIVE 3C–COMBINED PARKWAY EAST LEVEE–FURTHER MODIFIED (NORTH)

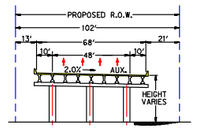
[AS PRESENTED IN THE TRINITY PARKWAY LSS, 2012]

NTTA
NORTH TEXAS TOLLWAY AUTHORITY





TRINITY PARKWAY – RIVER ALTERNATIVES
ELEVATED COMBINED PARKWAY



TRINITY PARKWAY – RIVER ALTERNATIVES
ELEVATED SEPARATED ROADWAY

TYPICAL SECTIONS
I.H. 35E TO FLOOD WAY

ALIGNMENT SUBJECT TO APPROVAL BY FHWA.

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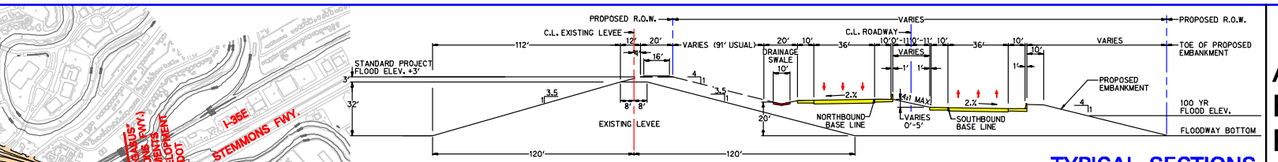
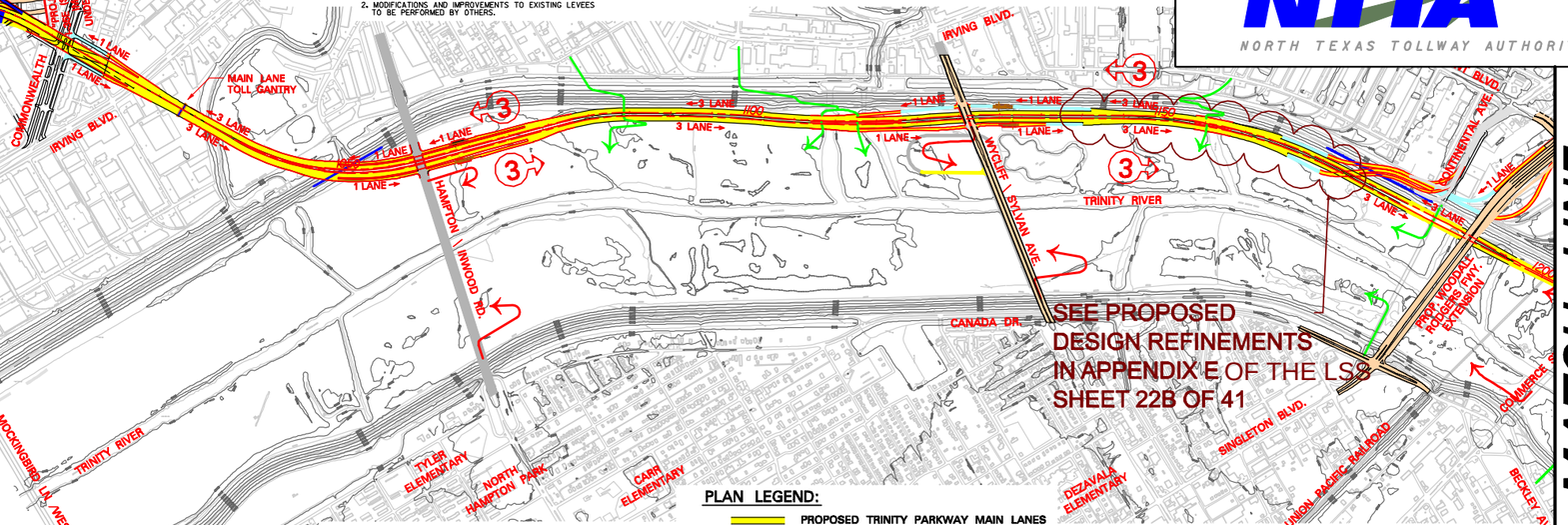
ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: June 20, 2008



NOTES:
1. FLOOD ELEVATIONS, LEVEE HEIGHTS AND SLOPES VARY. THOSE USED IN THIS SECTION ARE TYPICAL.
2. MODIFICATIONS AND IMPROVEMENTS TO EXISTING LEVEES TO BE PERFORMED BY OTHERS.

TRINITY PARKWAY – ALTERNATIVE 3C
HAMPTON – INWOOD TO CONTINENTAL
RIVER SIDE OF EAST LEVEE

TYPICAL SECTIONS
ALONG FLOODWAY



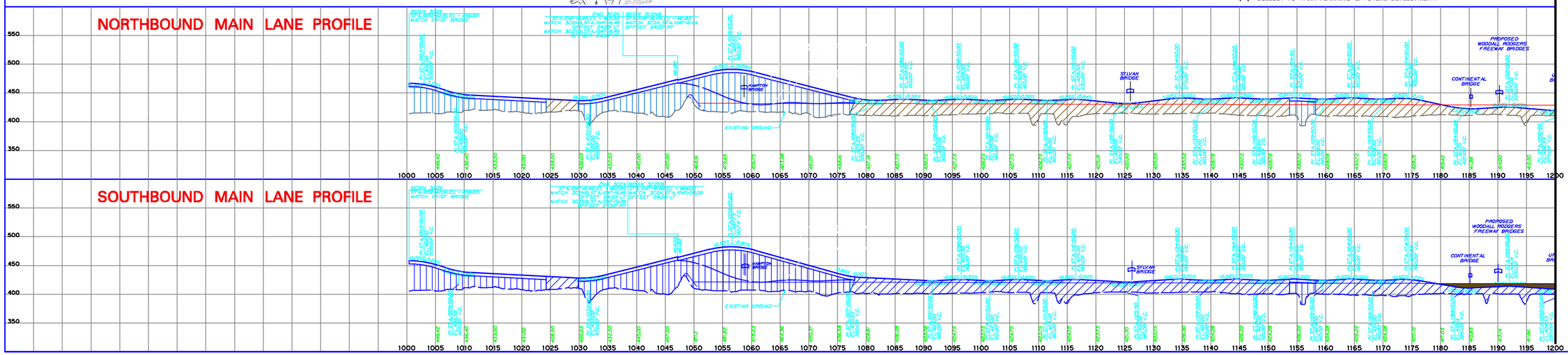
PROFILE LEGEND:
- PROPOSED MAIN LANES ON EMBANKMENT
- PROPOSED ELEVATED MAIN LANES
- PROPOSED FLOOD SEPARATION WALL ALONG I
- 100–YEAR FLOOD WATER LEVEL
- SPF WATER LEVEL
- EXISTING BRIDGE CROSSING

PLAN LEGEND:
- PROPOSED TRINITY PARKWAY MAIN LANES
- PROPOSED RAMP
- PROPOSED ELEVATED MAIN LANES
- PROPOSED ELEVATED RAMPS
- PROPOSED ARTERIAL OR SERVICE ROAD
- PROPOSED ROADWAY PROJECT (BY OTHERS)
- PROPOSED BRIDGE RECONSTRUCTION
- PROPOSED RAMP TOLL GANTRY (LOCATION SUBJECT TO CHANGE)
- PROPOSED FLOOD SEPARATION WALL
- PROPOSED RETAINING WALL
- DIAPHRAGM WALL

(3) NUMBER OF GENERAL PURPOSE LANES ALONG INDICATED MAIN LANE DIRECTION

PARK ACCESS ROUTES:
- VEHICULAR / BICYCLE / PEDESTRIAN ACCESS RAMP (BY NTTA)
- BICYCLE / PEDESTRIAN ACCESS BRIDGE (BY NTTA)
- POSSIBLE VEHICULAR / BICYCLE / PEDESTRIAN ACCESS ROUTE (**)
- POSSIBLE BICYCLE / PEDESTRIAN ACCESS ROUTE (**)

(**) – SUBJECT TO PARK PLANNING & FUTURE DEVELOPMENT.



1/4/2012 3:39:07 PM ah2003 TXDOT I:\17000s\17828\CADD\V7 to V8 UPGRADE\828-LSS-PP3C-N.dgn

PLATE 2-4 B

ALTERNATIVE 3C–COMBINED PARKWAY EAST LEVEE–FURTHER MODIFIED (SOUTH)

[AS PRESENTED IN THE TRINITY PARKWAY LSS, 2012]

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

PROFILE LEGEND:

- PROPOSED MAIN LANES ON EMBANKMENT
- PROPOSED ELEVATED MAIN LANES
- PROPOSED FLOOD SEPARATION WALL ALONG
- 100-YEAR FLOOD WATER LEVEL
- SPF WATER LEVEL
- EXISTING BRIDGE CROSSING

PLAN LEGEND:

- PROPOSED TRINITY PARKWAY MAIN LANES
- PROPOSED RAMP
- PROPOSED ELEVATED MAIN LANES
- PROPOSED ELEVATED RAMPS
- PROPOSED ARTERIAL OR SERVICE ROAD
- PROPOSED ROADWAY PROJECT (BY OTHERS)
- PROPOSED BRIDGE RECONSTRUCTION
- PROPOSED RAMP TOLL GANTRY (LOCATION SUBJECT TO CHANGE)
- PROPOSED FLOOD SEPARATION WALL
- PROPOSED RETAINING WALL
- DIAPHRAGM WALL

PARK ACCESS ROUTES:

- VEHICULAR / BICYCLE / PEDESTRIAN ACCESS RAMP (BY NTTA)
- BICYCLE / PEDESTRIAN ACCESS BRIDGE (BY NTTA)
- POSSIBLE VEHICULAR / BICYCLE / PEDESTRIAN ACCESS ROUTE (**)
- POSSIBLE BICYCLE / PEDESTRIAN ACCESS ROUTE (**)

(**) – SUBJECT TO PARK PLANNING & FUTURE DEVELOPMENT.

3 NUMBER OF GENERAL PURPOSE LANES ALONG INDICATED MAIN LANE DIRECTION

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NO THIRD PARTY IS AUTHORIZED TO RELY ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: June 20, 2008

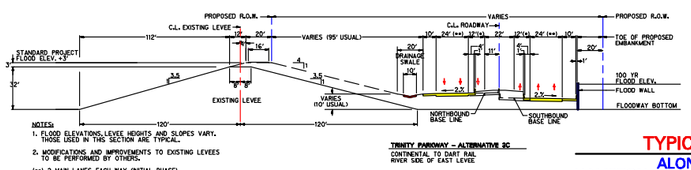
NOTES:

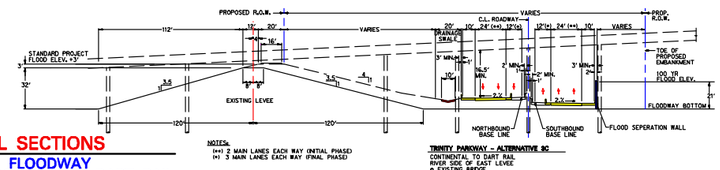
1. ALIGNMENT SUBJECT TO APPROVAL BY FHWA.

N

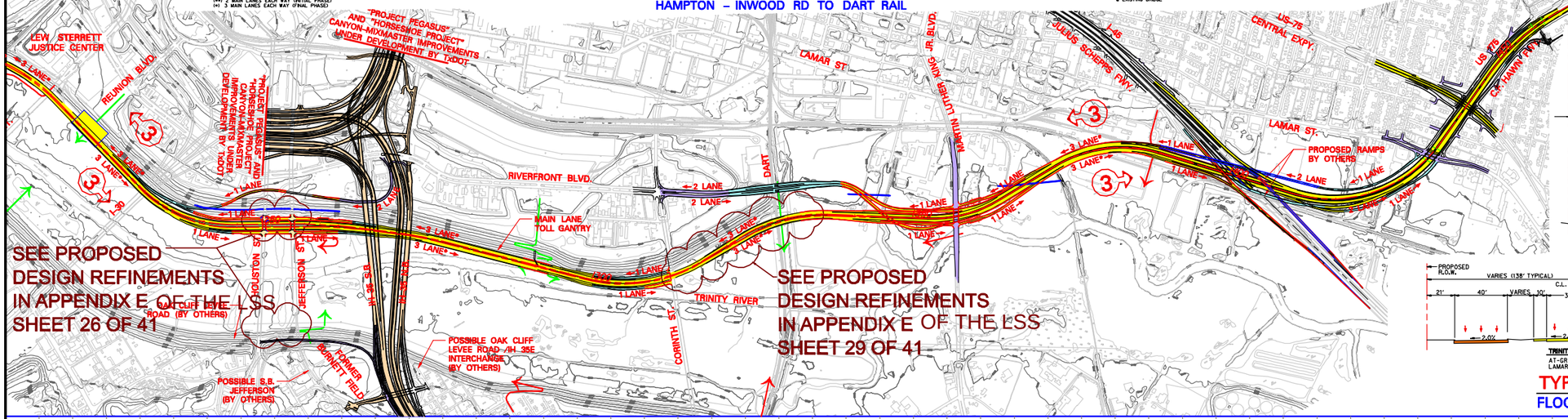
0 500 1000 1700 2500 3000
SCALE IN FEET

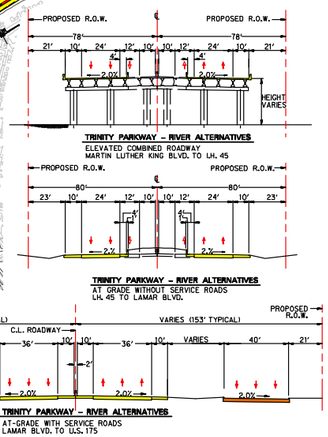
MATCH LINE



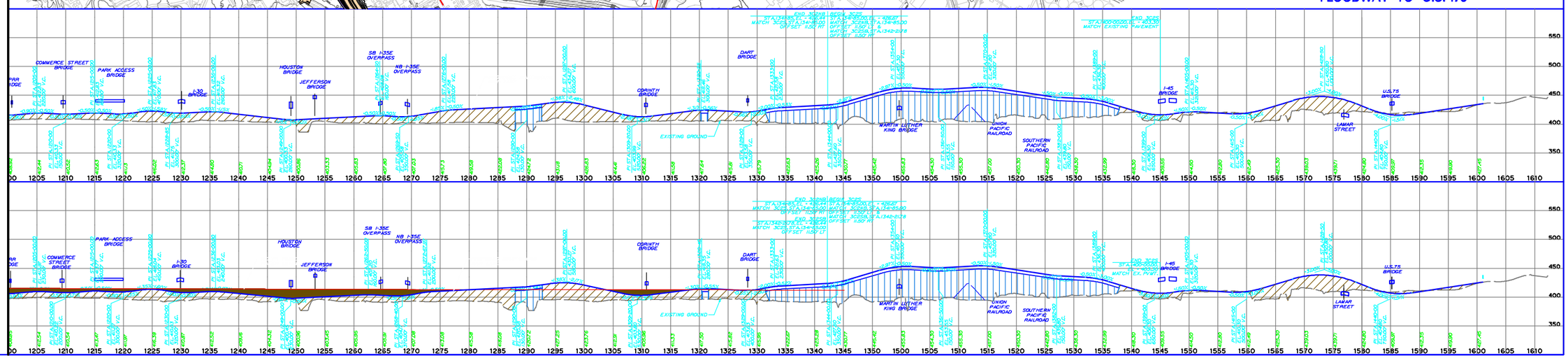


TYPICAL SECTIONS
ALONG FLOODWAY
HAMPTON – INWOOD RD TO DART RAIL





TYPICAL SECTIONS
FLOODWAY TO U.S. 175



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FOR NTTA USE ONLY–
DRAFT DOCUMENT SUBJECT TO CHANGE–
NO THIRD PARTY IS AUTHORIZED TO RELY
ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: AUGUST 17, 2007

NOTE:

THE FLOODWAY CROSS SECTION IS TYPICAL OF THE AREA BETWEEN THE HAMPTON ROAD AND CONTINENTAL AVENUE TRINITY RIVER CROSSINGS, LOOKING DOWNSTREAM. IT DOES NOT REPRESENT RAMPS, AUXILIARY LANES, OR MAIN LANE SUPER ELEVATION.

0 25 50 75 100 150 200 300
SCALE IN FEET

PLATE 2-4 C

FLOODWAY SECTION FOR ALTERNATIVE 3C – COMBINED PARKWAY – FURTHER MODIFIED

[AS PRESENTED IN THE TRINITY PARKWAY LSS, 2012]

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

COMBINED PARKWAY – MODIFIED
SECTION LOOKING DOWNSTREAM (SOUTH)

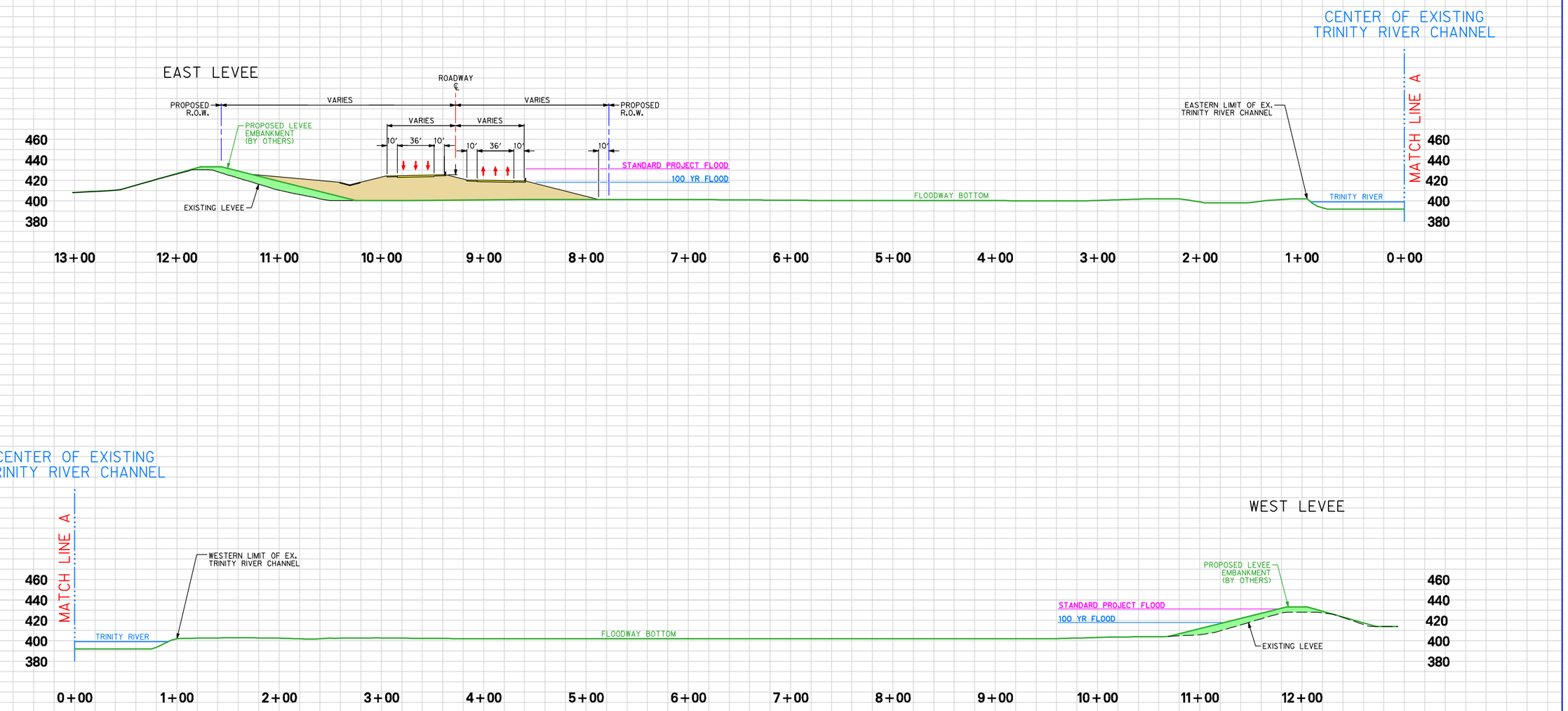
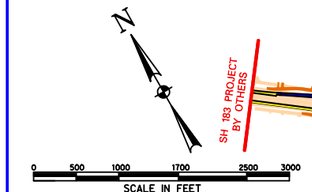
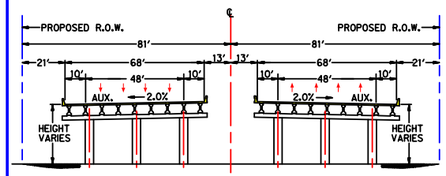


PLATE 2-5 A

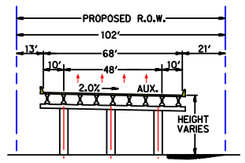
ALTERNATIVE 4B– SPLIT PARKWAY–RIVERSIDE MODIFIED (NORTH)

NTTA® NORTH TEXAS TOLLWAY AUTHORITY





TRINITY PARKWAY – RIVER ALTERNATIVES
ELEVATED COMBINED PARKWAY



TRINITY PARKWAY – RIVER ALTERNATIVES
ELEVATED SEPARATED ROADWAY

TYPICAL SECTIONS
I.H. 35E TO FLOOD WAY

NOTE:

ALIGNMENT SUBJECT TO APPROVAL BY FHWA.

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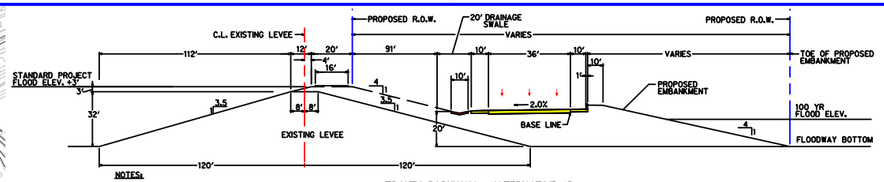
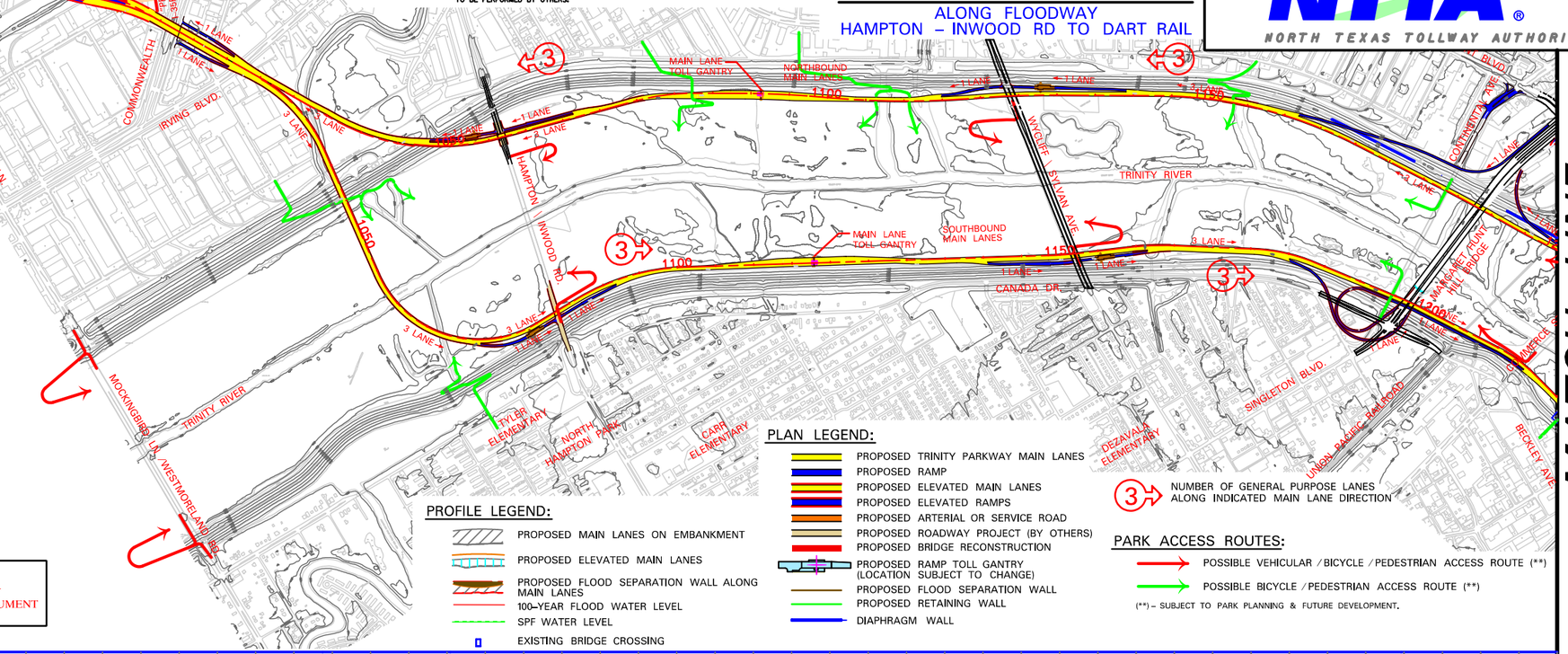
ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: JUNE 20, 2008



NOTES:
1. FLOOD ELEVATIONS, LEVEE HEIGHTS AND SLOPES VARY. THOSE USED IN THIS SECTION ARE TYPICAL.
2. MODIFICATIONS AND IMPROVEMENTS TO EXISTING LEVEES TO BE PERFORMED BY OTHERS.

TRINITY PARKWAY – ALTERNATIVE 4B
HAMPTON – INWOOD RD TO CONTINENTAL RD

TYPICAL SECTIONS
ALONG FLOODWAY
HAMPTON – INWOOD RD TO DART RAIL



MATCH LINE

PROFILE LEGEND:

- PROPOSED MAIN LANES ON EMBANKMENT
- PROPOSED ELEVATED MAIN LANES
- PROPOSED FLOOD SEPARATION WALL ALONG MAIN LANES
- 100–YEAR FLOOD WATER LEVEL
- SPF WATER LEVEL
- EXISTING BRIDGE CROSSING

PLAN LEGEND:

- PROPOSED TRINITY PARKWAY MAIN LANES
- PROPOSED RAMP
- PROPOSED ELEVATED MAIN LANES
- PROPOSED ELEVATED RAMPS
- PROPOSED ARTERIAL OR SERVICE ROAD
- PROPOSED ROADWAY PROJECT (BY OTHERS)
- PROPOSED BRIDGE RECONSTRUCTION
- PROPOSED RAMP TOLL GANTRY (LOCATION SUBJECT TO CHANGE)
- PROPOSED FLOOD SEPARATION WALL
- PROPOSED RETAINING WALL
- DIAPHRAGM WALL

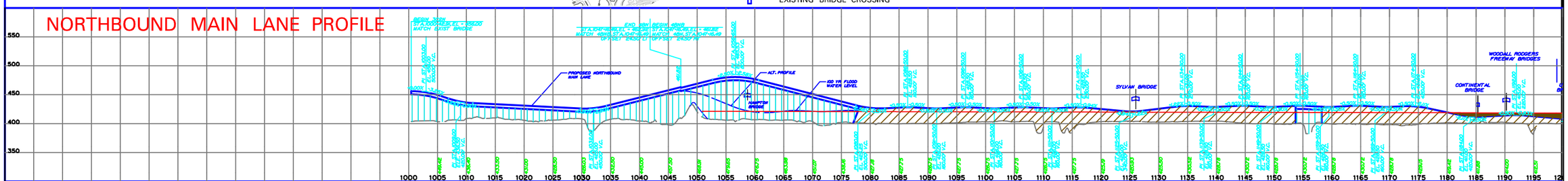
(3) NUMBER OF GENERAL PURPOSE LANES ALONG INDICATED MAIN LANE DIRECTION

PARK ACCESS ROUTES:

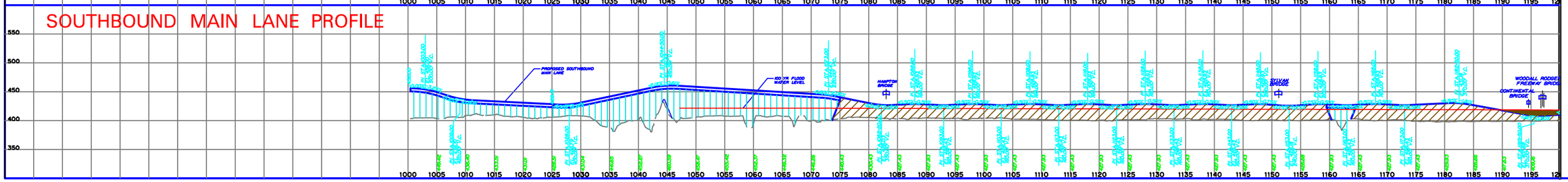
- POSSIBLE VEHICULAR / BICYCLE / PEDESTRIAN ACCESS ROUTE (**)
- POSSIBLE BICYCLE / PEDESTRIAN ACCESS ROUTE (**)

(**) – SUBJECT TO PARK PLANNING & FUTURE DEVELOPMENT.

NORTHBOUND MAIN LANE PROFILE



SOUTHBOUND MAIN LANE PROFILE



PROFILE LEGEND:

- PROPOSED MAIN LANES ON EMBANKMENT
- PROPOSED ELEVATED MAIN LANES
- PROPOSED FLOOD SEPARATION WALL ALONG MAIN LANES
- 100-YEAR FLOOD WATER LEVEL
- SPF WATER LEVEL
- EXISTING BRIDGE CROSSING

PLAN LEGEND:

- PROPOSED TRINITY PARKWAY MAIN LANES
- PROPOSED RAMP
- PROPOSED ELEVATED MAIN LANES
- PROPOSED ELEVATED RAMPS
- PROPOSED ARTERIAL OR SERVICE ROAD
- PROPOSED ROADWAY PROJECT (BY OTHERS)
- PROPOSED BRIDGE RECONSTRUCTION
- PROPOSED RAMP TOLL GANTRY (LOCATION SUBJECT TO CHANGE)
- PROPOSED FLOOD SEPARATION WALL
- PROPOSED RETAINING WALL
- DIAPHRAGM WALL

PARK ACCESS ROUTES:

- POSSIBLE VEHICULAR / BICYCLE / PEDESTRIAN ACCESS ROUTE (**)
- POSSIBLE BICYCLE / PEDESTRIAN ACCESS ROUTE (**)

(**) – SUBJECT TO PARK PLANNING & FUTURE DEVELOPMENT.

③ NUMBER OF GENERAL PURPOSE LANES ALONG INDICATED MAIN LANE DIRECTION

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DATE: JUNE 20, 2008

NOTES:

1. ALIGNMENT SUBJECT TO APPROVAL BY FHWA.

N

0 500 1000 1700 2500 3000
SCALE IN FEET

PLATE 2-5 B

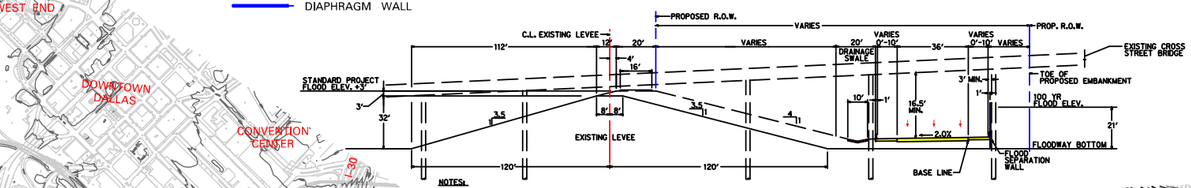
ALTERNATIVE 4B– SPLIT PARKWAY–RIVERSIDE MODIFIED (SOUTH)

NTTA® NORTH TEXAS TOLLWAY AUTHORITY

MATCH LINE

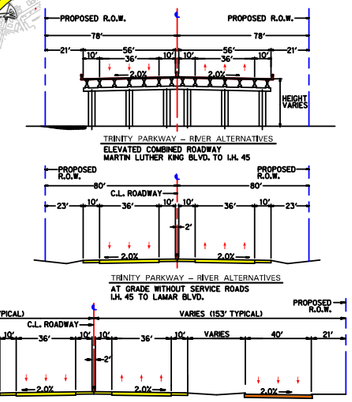
WEST END
DOWNTOWN DALLAS
CONVENTION CENTER
I-30
REUNION BLVD
REUNION OVERLOOK PLATFORM
"PROJECT PEGASUS" AND "HORSESHOE PROJECT" CANYON-MAINMASTER IMPROVEMENTS UNDER DEVELOPMENT BY TxDOT
HOUSTON ST
JEFFERSON ST
IH-35 SB
IH-35 NB
JEFFERSON BOULEVARD BRIDGE (BY OTHERS)
TURNER BURNETT FIELD
RIVERFRONT BLVD
MAIN LANE TOLL GANTRY
DART
TRINITY RIVER
CORINTH ST
CEDAR CREST BLVD
LAMAR ST
MARTIN LUTHER KING JR BLVD
JULIUS SCHEPPS FWY
US 175 SM WRIGHT
ACE HAMM
SH 310
1250 LANE
1300 LANE

TYPICAL SECTIONS
ALONG FLOODWAY
HAMPTON – INWOOD RD TO DART RAIL



NOTES:
1. FLOOD ELEVATIONS, LEVEE HEIGHTS AND SLOPES VARY. THOSE USED IN THIS SECTION ARE TYPICAL.
2. MODIFICATIONS AND IMPROVEMENTS TO EXISTING LEVEES TO BE PERFORMED BY OTHERS.

TRINITY PARKWAY – ALTERNATIVE 4B
CONTINENTAL RD TO DART RAIL
RIVER SIDE OF LEVEE @ EXISTING BRIDGE

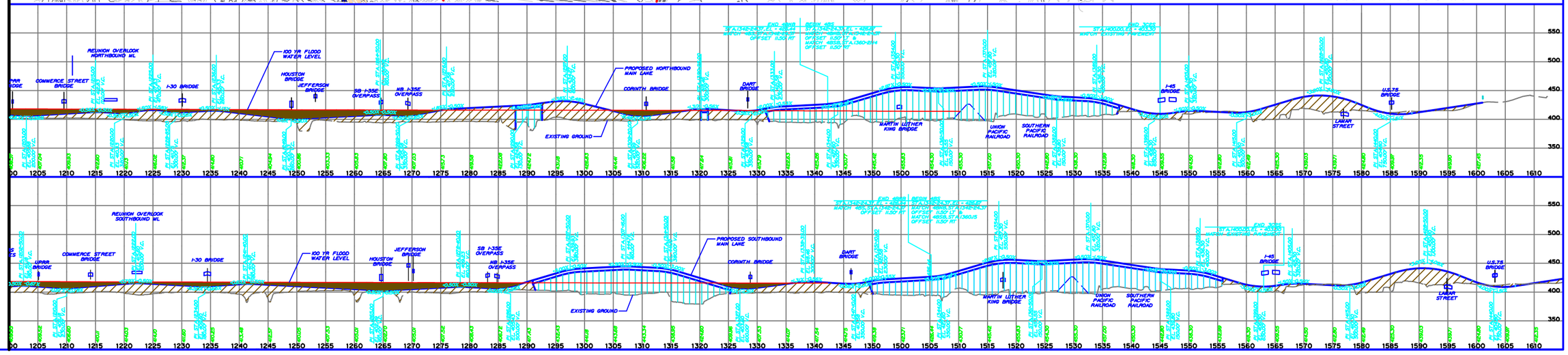


TRINITY PARKWAY – RIVER ALTERNATIVES
ELEVATED COMBINED ROADWAY
MARTIN LUTHER KING BLVD. TO I.H. 45

TRINITY PARKWAY – RIVER ALTERNATIVES
AT-GRADE WITHOUT SERVICE ROADS
I.H. 45 TO LAMAR BLVD.

TRINITY PARKWAY – RIVER ALTERNATIVES
AT-GRADE WITH SERVICE ROADS
LAMAR BLVD. TO U.S. 175

TYPICAL SECTIONS
FLOODWAY TO U.S. 175



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DRAFT DOCUMENT SUBJECT TO CHANGE–
NO THIRD PARTY IS AUTHORIZED TO RELY
ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: AUGUST 17, 2007

NOTE:

THE FLOODWAY CROSS SECTION IS TYPICAL OF THE AREA BETWEEN THE HAMPTON ROAD AND CONTINENTAL AVENUE TRINITY RIVER CROSSINGS, LOOKING DOWNSTREAM. IT DOES NOT REPRESENT RAMPS, AUXILIARY LANES, OR MAIN LANE SUPER ELEVATION.

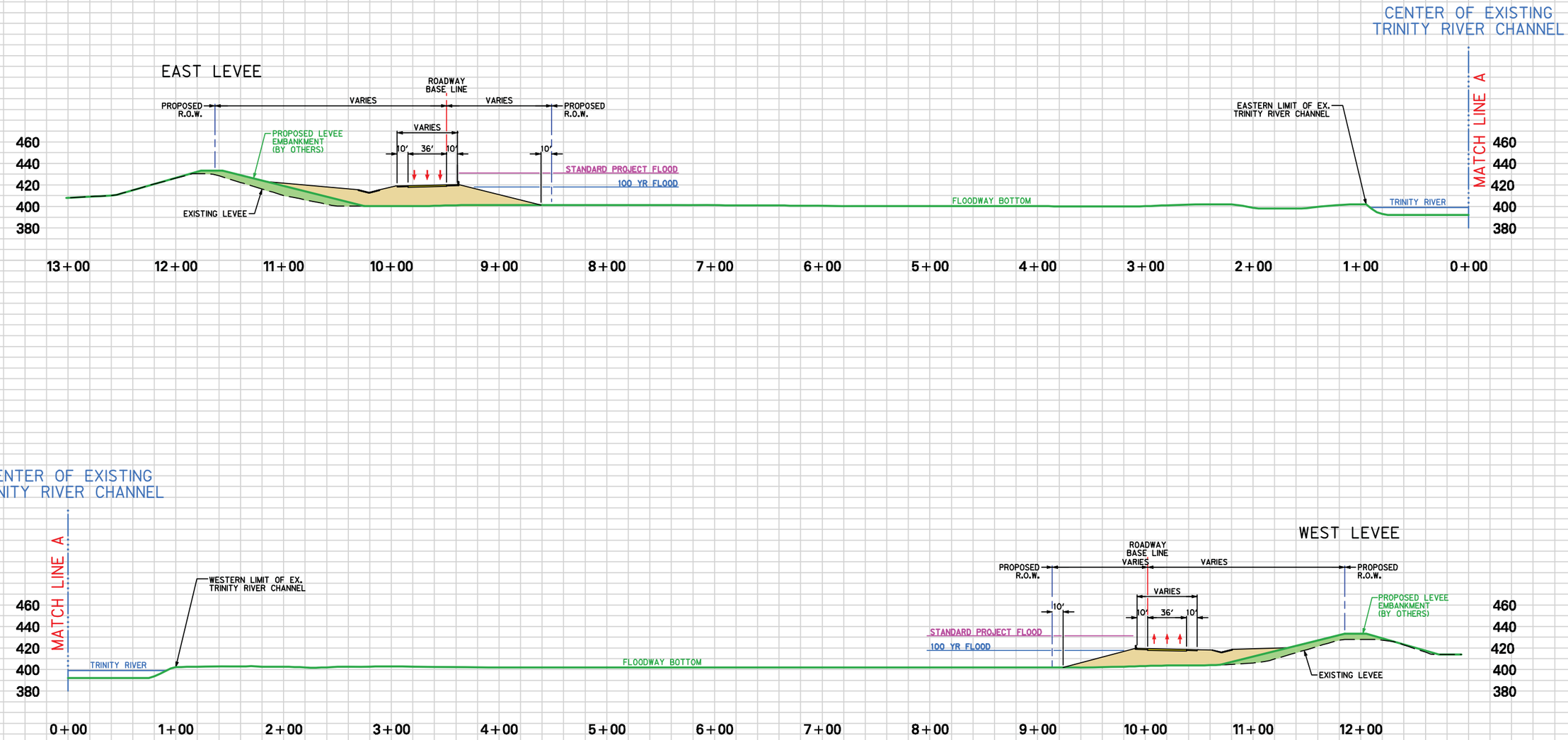
0 25 50 75 100 150 200 300
SCALE IN FEET

PLATE 2-5C

FLOODWAY SECTION FOR ALTERNATIVE 4B SPLIT PARKWAY – RIVERSIDE

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

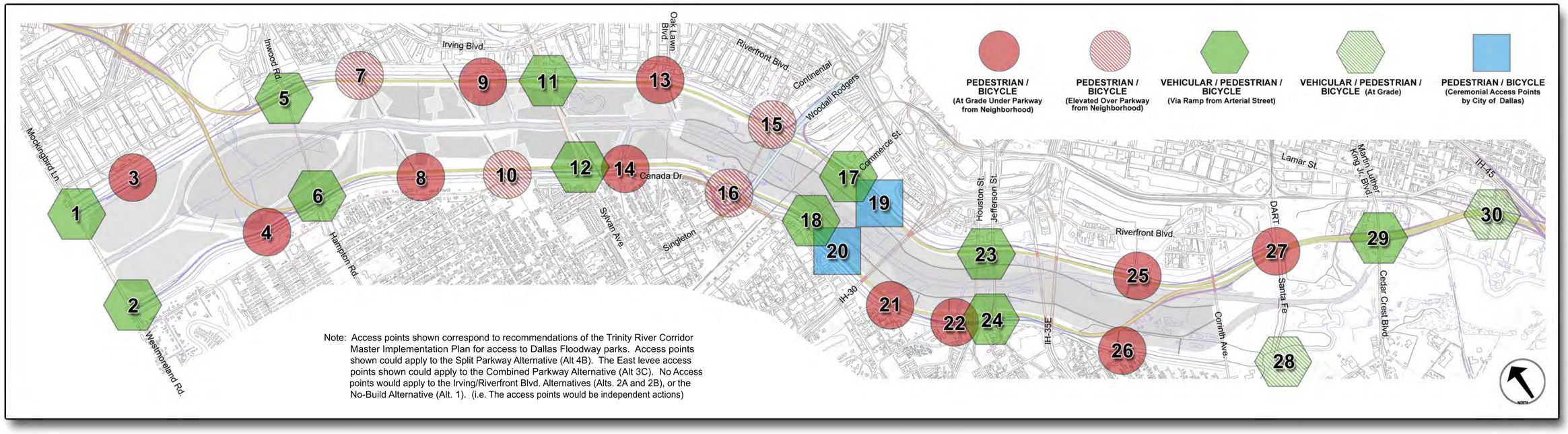
SPLIT PARKWAY – RIVERSIDE
SECTION LOOKING DOWNSTREAM (SOUTH)



Park Access For Trinity River Corridor Master Implementation Plan

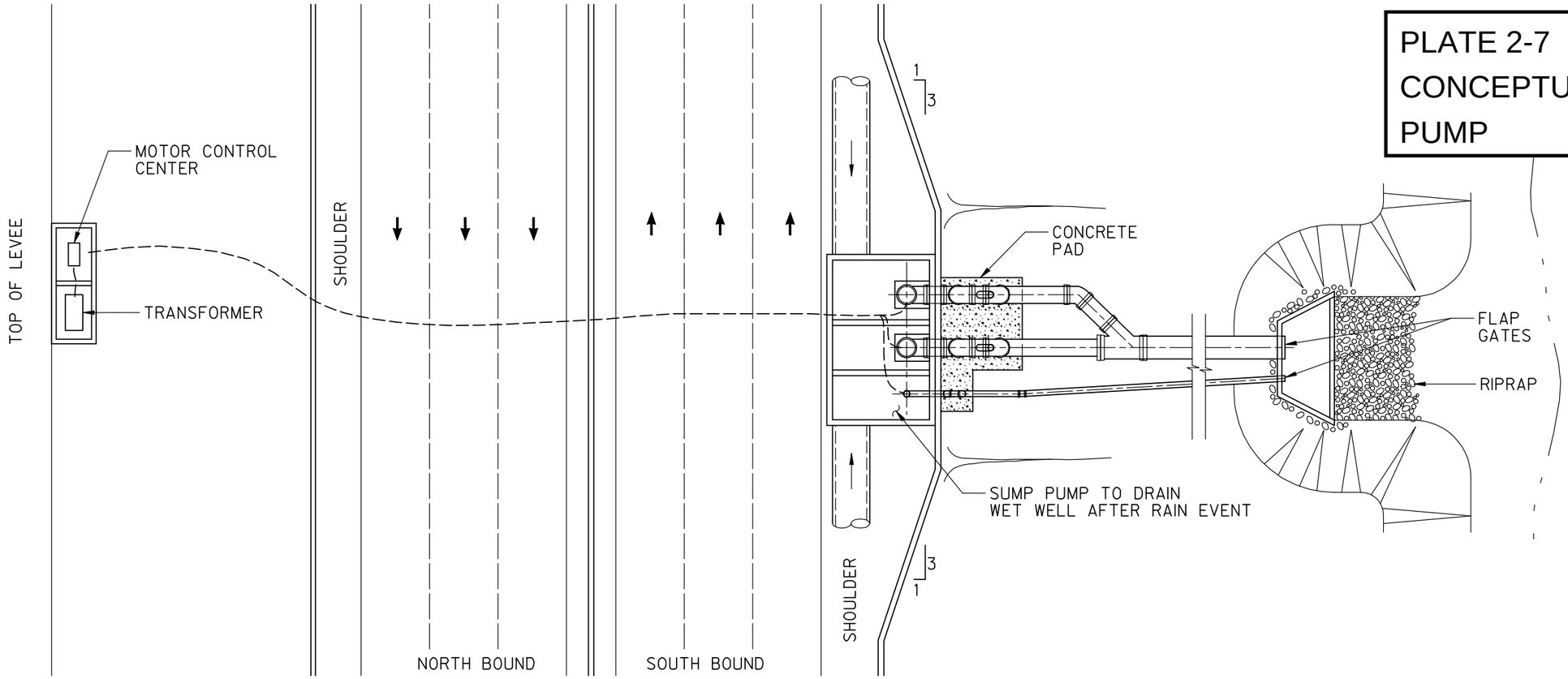
Plate 2-6
Potential
Park Access
Locations

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

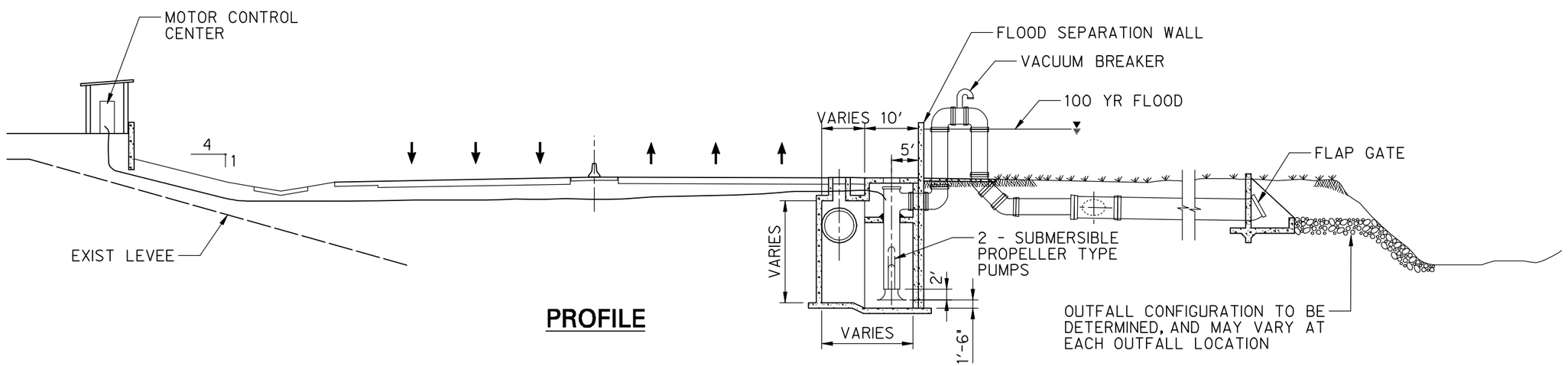


Note: Access points shown correspond to recommendations of the Trinity River Corridor Master Implementation Plan for access to Dallas Floodway parks. Access points shown could apply to the Split Parkway Alternative (Alt 4B). The East levee access points shown could apply to the Combined Parkway Alternative (Alt 3C). No Access points would apply to the Irving/Riverfront Blvd. Alternatives (Alts. 2A and 2B), or the No-Build Alternative (Alt. 1). (i.e. The access points would be independent actions)

PLATE 2-7
CONCEPTUAL PUMP



PLAN



PROFILE

OCTOBER 16, 2007

CONCEPTUAL PUMP STATION
TRINITY PARKWAY EIS
NORTH TEXAS TOLL AUTHORITY
DALLAS , TEXAS

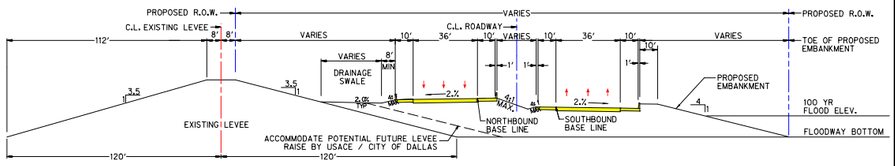
NTTA NORTH TEXAS TOLLWAY AUTHORITY

NO.		
FILE	826-PUMP	
NOTES	17826	
SCALE	1"=20'	
DATE	OCT. 2007	
DRAWN	TNL	
DESIGN	HALFF	

PLATE 2-8 A

ALTERNATIVE 3C–COMBINED PARKWAY RIVERSIDE–FURTHER MODIFIED (NORTH)

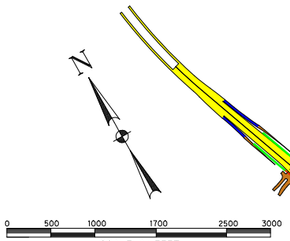
NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

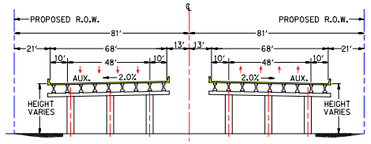


NOTES:
1. FLOOD ELEVATIONS, LEVEE HEIGHTS AND SLOPES VARY. THOSE USED IN THIS SECTION ARE TYPICAL.
2. MODIFICATIONS AND IMPROVEMENTS TO EXISTING LEVEES TO BE PERFORMED BY OTHERS.

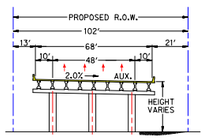
TRINITY PARKWAY – ALTERNATIVE 3C
HAMPTON – INWOOD TO CONTINENTAL
RIVER SIDE OF EAST LEVEE

TYPICAL SECTIONS
ALONG FLOODWAY





TRINITY PARKWAY – RIVER ALTERNATIVES
ELEVATED COMBINED PARKWAY

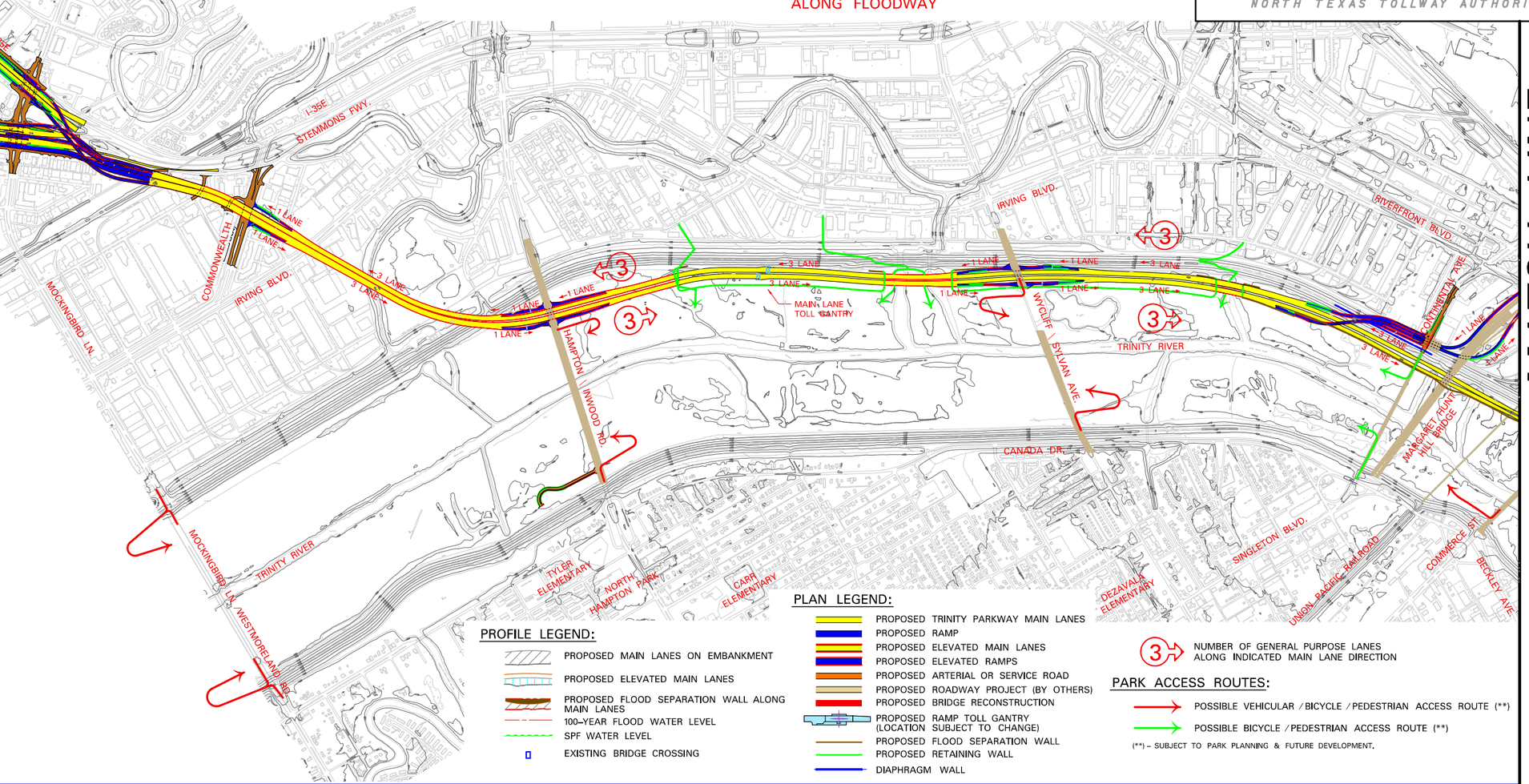


TRINITY PARKWAY – RIVER ALTERNATIVES
ELEVATED SEPARATED ROADWAY

TYPICAL SECTIONS
I.H. 35E TO FLOOD WAY

ALIGNMENT SUBJECT TO APPROVAL BY FHWA.

FOR NTTA USE ONLY–
DRAFT DOCUMENT SUBJECT TO CHANGE–
NO THIRD PARTY IS AUTHORIZED TO RELY
ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: MAY 31, 2013



MATCH LINE

PROFILE LEGEND:
- PROPOSED MAIN LANES ON EMBANKMENT
- PROPOSED ELEVATED MAIN LANES
- PROPOSED FLOOD SEPARATION WALL ALONG MAIN LANES
- 100–YEAR FLOOD WATER LEVEL
- SPF WATER LEVEL
- EXISTING BRIDGE CROSSING

PLAN LEGEND:
- PROPOSED TRINITY PARKWAY MAIN LANES
- PROPOSED RAMP
- PROPOSED ELEVATED MAIN LANES
- PROPOSED ELEVATED RAMPS
- PROPOSED ARTERIAL OR SERVICE ROAD
- PROPOSED ROADWAY PROJECT (BY OTHERS)
- PROPOSED BRIDGE RECONSTRUCTION
- PROPOSED RAMP TOLL GANTRY (LOCATION SUBJECT TO CHANGE)
- PROPOSED FLOOD SEPARATION WALL
- PROPOSED RETAINING WALL
- DIAPHRAGM WALL

(3) NUMBER OF GENERAL PURPOSE LANES ALONG INDICATED MAIN LANE DIRECTION

PARK ACCESS ROUTES:
- POSSIBLE VEHICULAR / BICYCLE / PEDESTRIAN ACCESS ROUTE (**)
- POSSIBLE BICYCLE / PEDESTRIAN ACCESS ROUTE (**)

(**) – SUBJECT TO PARK PLANNING & FUTURE DEVELOPMENT.

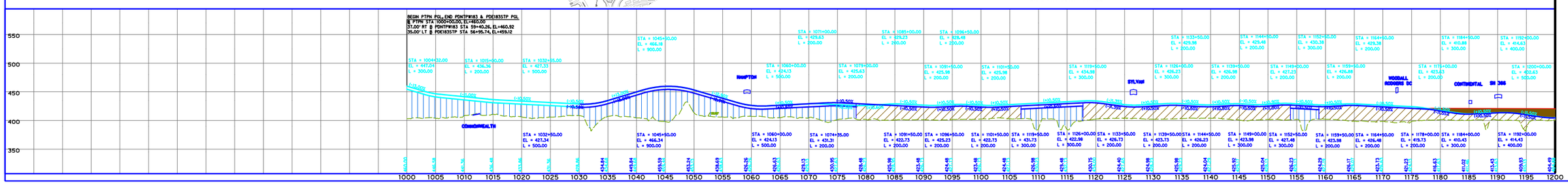


PLATE 2-8 B

ALTERNATIVE 3C–COMBINED PARKWAY RIVERSIDE–FURTHER MODIFIED (SOUTH)

NTTA® NORTH TEXAS TOLLWAY AUTHORITY

PROFILE LEGEND:

- PROPOSED MAIN LANES ON EMBANKMENT
- PROPOSED ELEVATED MAIN LANES
- PROPOSED FLOOD SEPARATION WALL ALONG MAIN LANES
- 100–YEAR FLOOD WATER LEVEL
- SPF WATER LEVEL
- EXISTING BRIDGE CROSSING

PLAN LEGEND:

- PROPOSED TRINITY PARKWAY MAIN LANES
- PROPOSED RAMP
- PROPOSED ELEVATED MAIN LANES
- PROPOSED ELEVATED RAMPS
- PROPOSED ARTERIAL OR SERVICE ROAD
- PROPOSED ROADWAY PROJECT (BY OTHERS)
- PROPOSED BRIDGE RECONSTRUCTION
- PROPOSED RAMP TOLL GANTRY (LOCATION SUBJECT TO CHANGE)
- PROPOSED FLOOD SEPARATION WALL
- PROPOSED RETAINING WALL
- DIAPHRAGM WALL

PARK ACCESS ROUTES:

- POSSIBLE VEHICULAR / BICYCLE / PEDESTRIAN ACCESS ROUTE BY OTHERS (**)
- POSSIBLE BICYCLE / PEDESTRIAN ACCESS ROUTE BY OTHERS (**)

(**) – SUBJECT TO PARK PLANNING & FUTURE DEVELOPMENT.

(3) NUMBER OF GENERAL PURPOSE LANES ALONG INDICATED MAIN LANE DIRECTION

FOR NTTA USE ONLY–
DRAFT DOCUMENT SUBJECT TO CHANGE–
NO THIRD PARTY IS AUTHORIZED TO RELY
ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: MAY 31, 2013

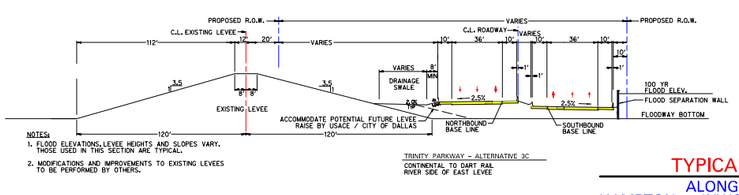
NOTES:

1. ALIGNMENT SUBJECT TO APPROVAL BY FHWA.

0 500 1000 1700 2500 3000
SCALE IN FEET

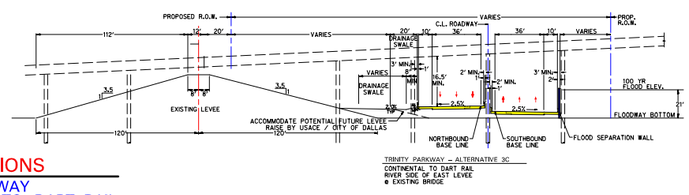
N

MATCH LINE



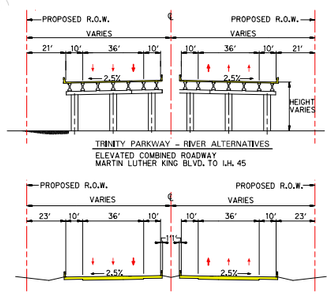
NOTES:
1. FLOOD ELEVATIONS, LEVEE HEIGHTS AND SLOPES VARY. THOSE USED IN THIS SECTION ARE TYPICAL.
2. MODIFICATIONS AND IMPROVEMENTS TO EXISTING LEVEES TO BE PERFORMED BY OTHERS.

TRINITY PARKWAY – ALTERNATIVE 3C
CONTINENTAL TO DART RAIL
RIVER SIDE OF EAST LEVEE

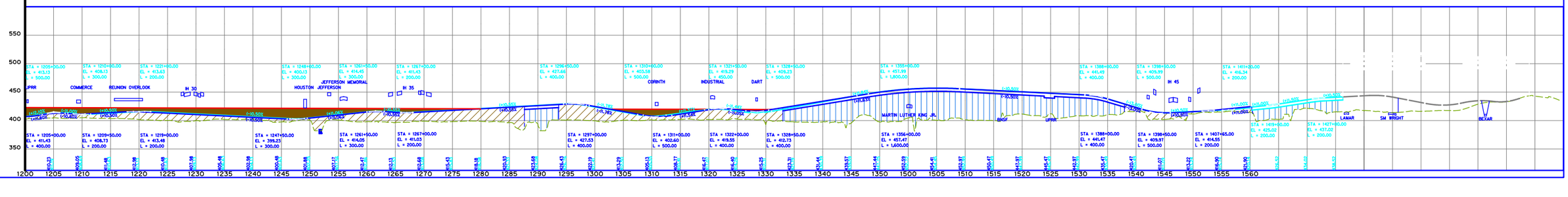


TRINITY PARKWAY – ALTERNATIVE 3C
CONTINENTAL TO DART RAIL
RIVER SIDE OF EAST LEVEE
@ EXISTING BRIDGE

TYPICAL SECTIONS
ALONG FLOODWAY
HAMPTON – INWOOD RD TO DART RAIL



TYPICAL SECTIONS
FLOODWAY TO U.S. 175



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DRAFT DOCUMENT SUBJECT TO CHANGE–
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ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: OCTOBER 18, 2013

NOTE:

THE FLOODWAY CROSS SECTION IS TYPICAL OF THE AREA BETWEEN THE HAMPTON ROAD AND CONTINENTAL AVENUE TRINITY RIVER CROSSINGS, LOOKING DOWNSTREAM. IT DOES NOT REPRESENT RAMPS, AUXILIARY LANES, OR MAIN LANE SUPER ELEVATION.

0 25 50 75 100 150 200 300
SCALE IN FEET

PLATE 2-8 C

FLOODWAY SECTION FOR ALTERNATIVE 3C – COMBINED PARKWAY RIVERSIDE (FURTHER MODIFIED)

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

COMBINED PARKWAY – MODIFIED
SECTION LOOKING DOWNSTREAM (SOUTH)

826-PP3C-Median.DGN

PLATE 2-8 D

ALTERNATIVE 3C MEDIAN WIDTH TRANSITIONS

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

N

0 500 1000 1500 2000 3000
SCALE IN FEET

WEST END
DOWNTOWN DALLAS
CONVENTION CENTER
"PROJECT PEGASUS" CANYON/MIXMASTER IMPROVEMENTS UNDER DEVELOPMENT BY TxDOT
RIVERFRONT BLVD.
CONTINENTAL AVE.
LEW STERRETT JUSTICE CENTER
REUNION BLVD.
REUNION OVERLOOK PLATFORM
I-30
TRANSITION
VARIABLE WIDTH MEDIAN 10' INSIDE SHOULDERS
VAR. MED. WIDTH 10' INSIDE SHOULDERS
MARGARET HUNT HILL BRIDGE
TRINITY RIVER
CORINTH ST.
IH-35 S.B.
IH-35 N.B.
HOUSTON ST.
JEFFERSON ST.
JEFFERSON MEMORIAL BRIDGE (BY OTHERS)
FORMER BURNETT FIELD
UNION PACIFIC RAILROAD
COMMERCE ST.
BECKLEY AVE.

FOR NTTA USE ONLY–
DRAFT DOCUMENT SUBJECT TO CHANGE–
NO THIRD PARTY IS AUTHORIZED TO RELY
ON INFORMATION CONTAINED IN THIS DOCUMENT
DATE: JANUARY 28, 2013

PLATE 2 - 9: Sheet 1 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
- Proposed Diaphragm Wall
- Proposed Flood Wall
- Proposed Retaining Wall
- Proposed Security Wall
- Proposed Culvert
- Proposed Rail
- Proposed Center Barrier
- Proposed Edge of Concrete Pavement
- Proposed Type 2 Curb
- Proposed Sidewalk Edge
- Project by Others
- Proposed Toll Gantry
- Proposed Pavement (by Others)
- Existing Bridge
- Proposed Cross Street at Grade
- Proposed Cross Street Bridge
- Proposed Bridge/Pavement Removal
- Proposed Frontage Road at Grade
- Proposed Mainlane at Grade
- Proposed Mainlane Bridge
- Proposed Park Access
- Proposed Pedstrian Over Bridge
- Proposed Ramp at Grade
- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

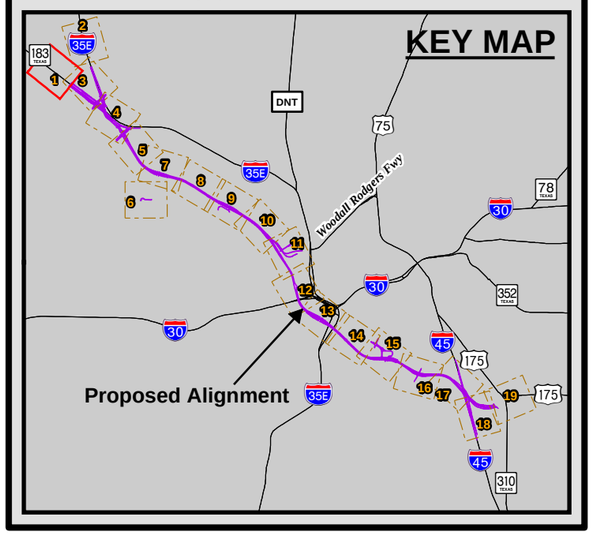

PLATE 2 - 9: Sheet 2 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
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N

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SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

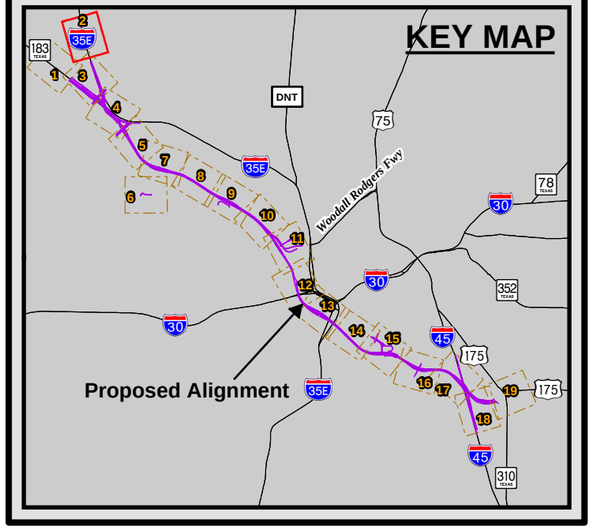
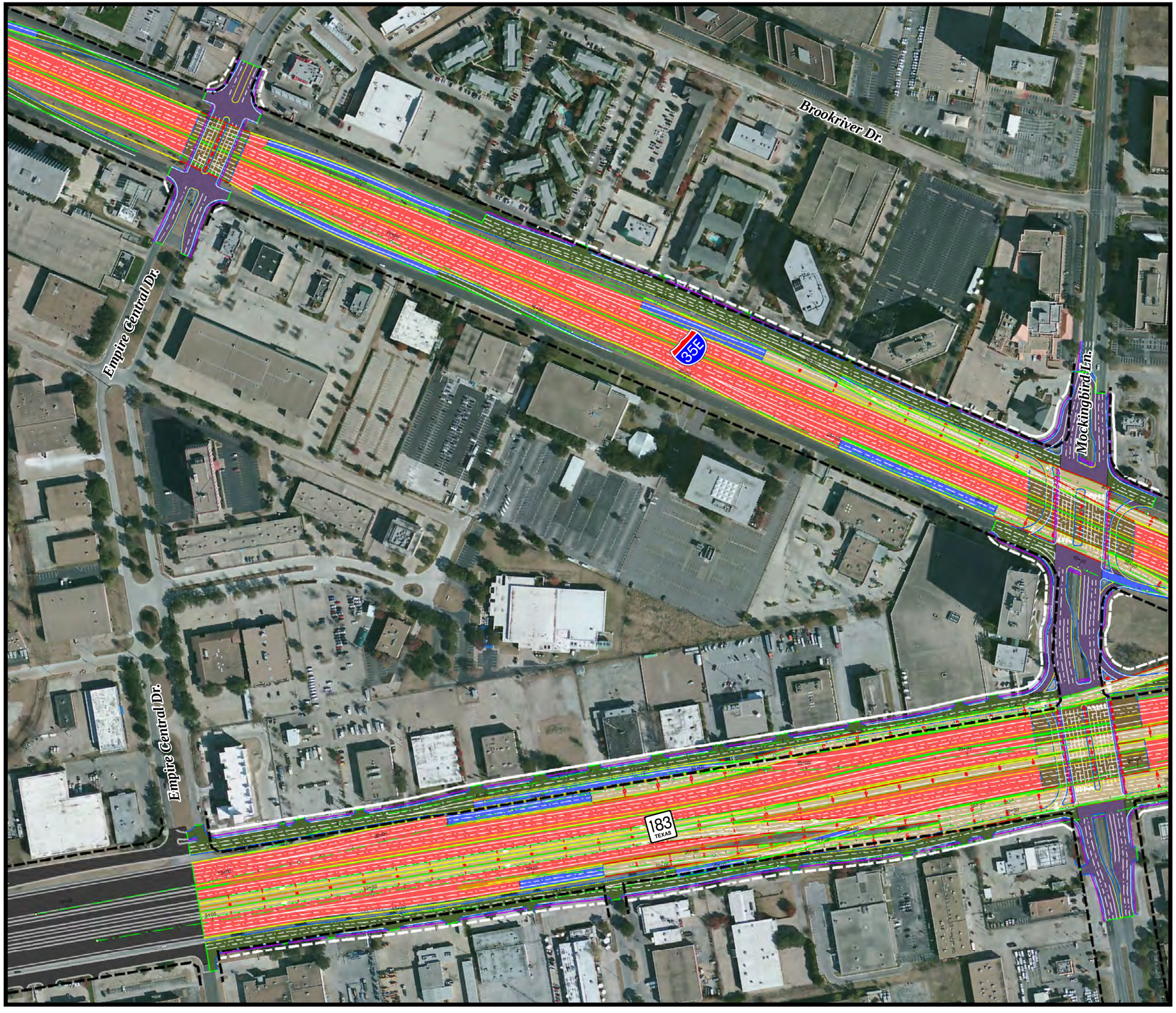


PLATE 2 - 9: Sheet 3 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Operation & Maintenance Road for Levee Control
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- Proposed Flood Wall
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- Proposed ROW

N

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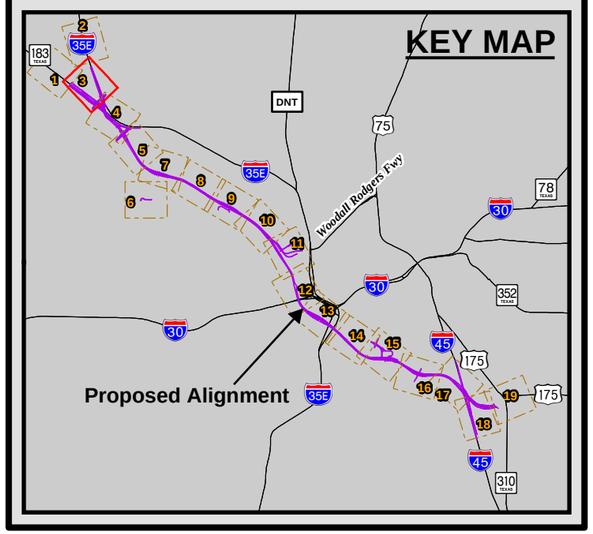
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.



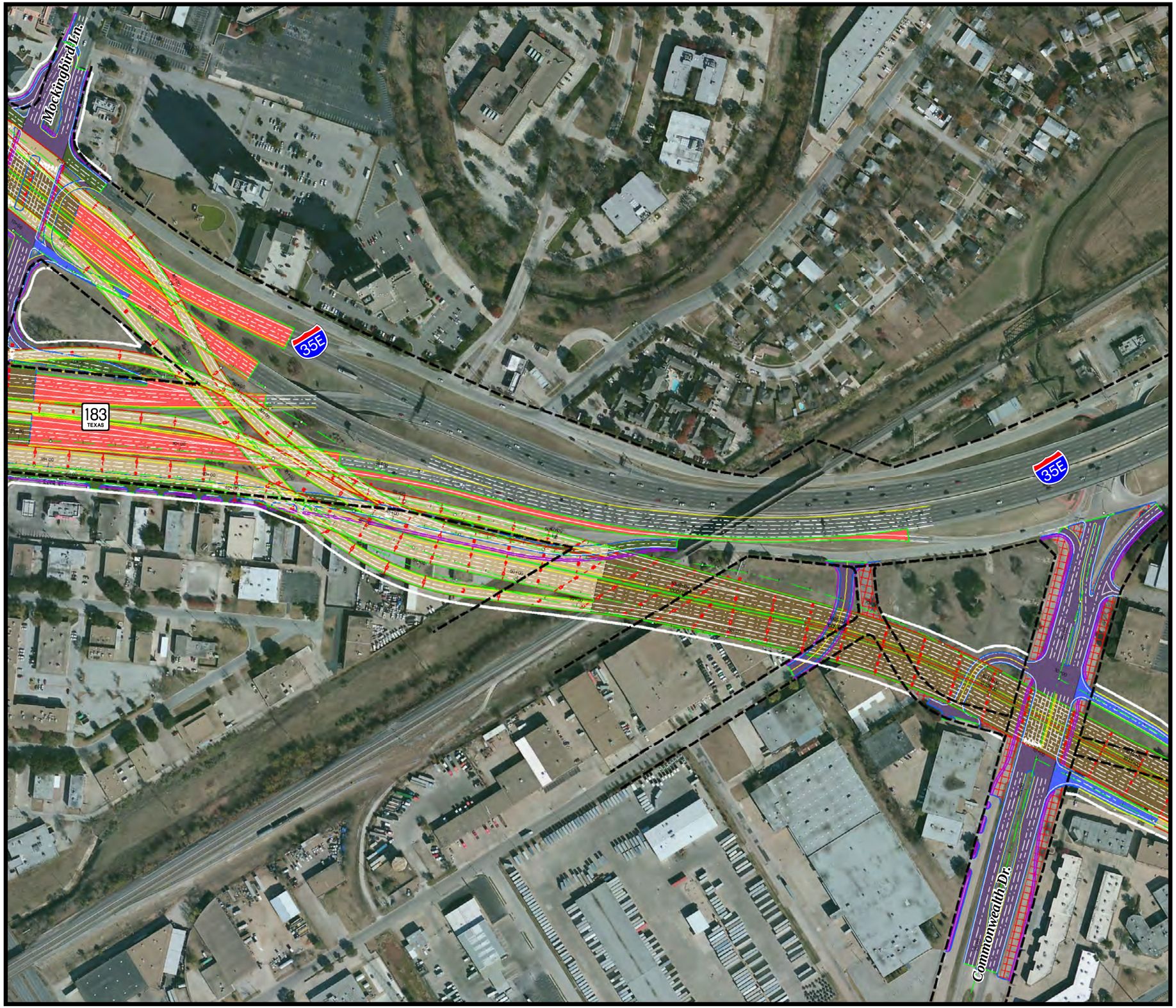


PLATE 2 - 9: Sheet 4 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
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- Proposed Flood Wall
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- Proposed Ramp Bridge
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- Proposed ROW

N

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SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

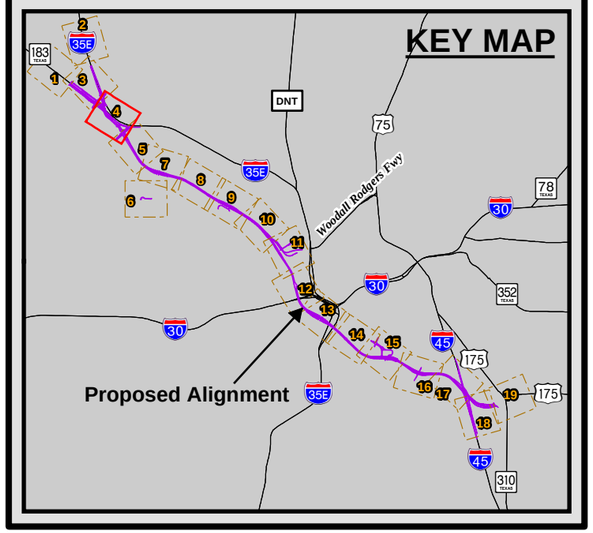
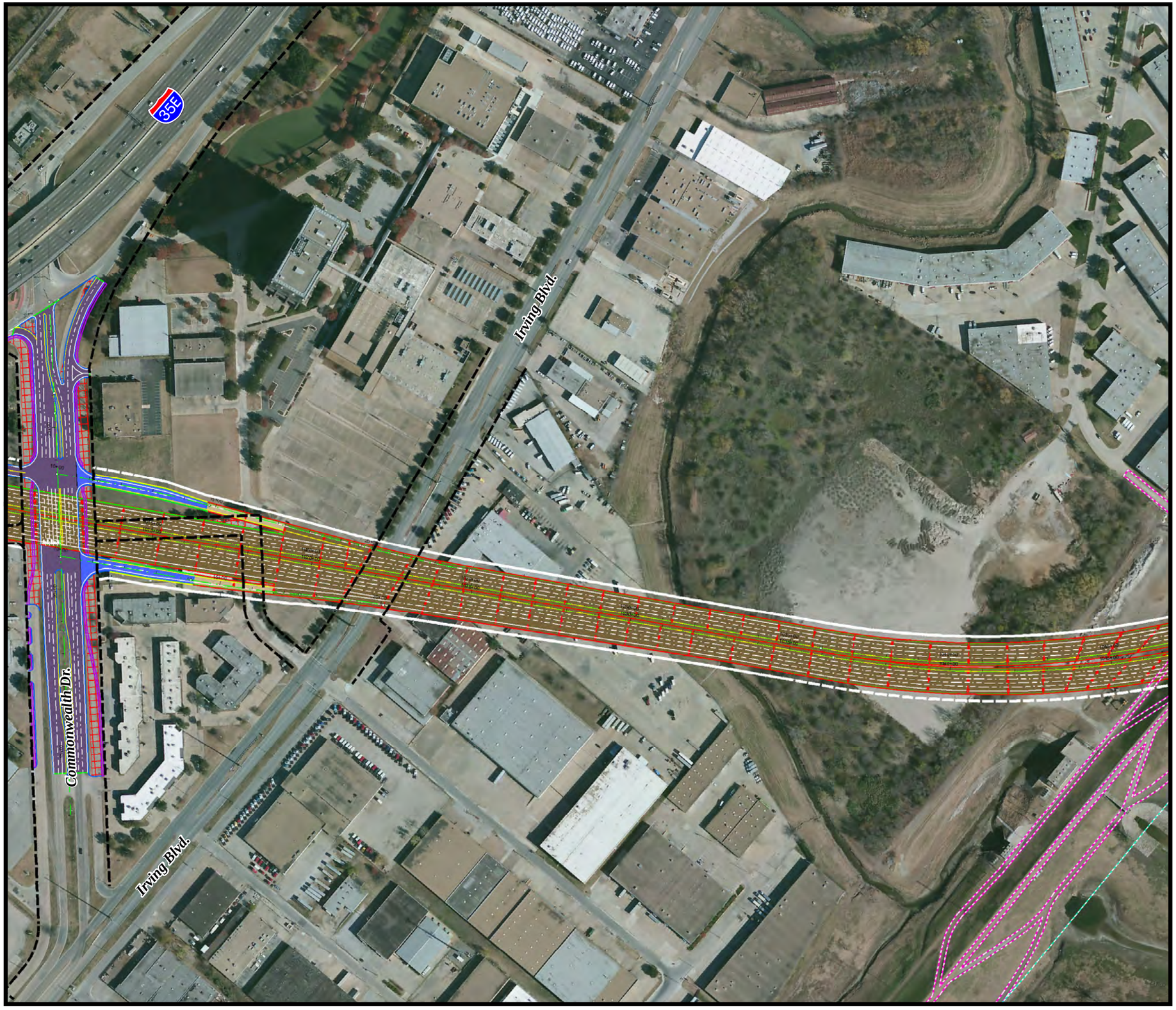


PLATE 2 - 9: Sheet 5 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
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- Proposed Pedestrian Over Bridge
- Proposed Ramp at Grade
- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

N

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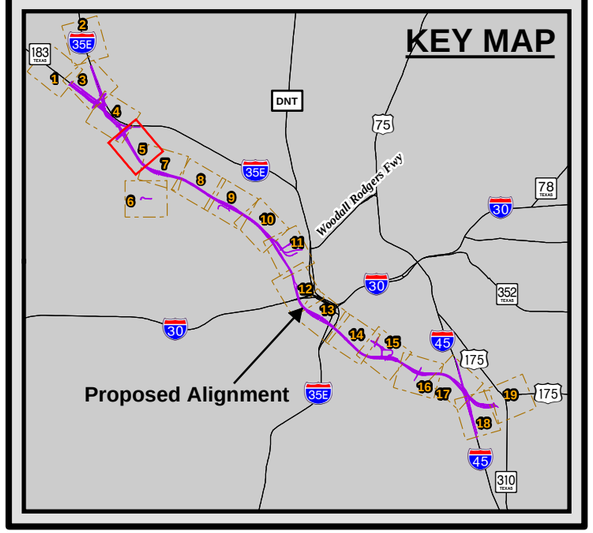
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.



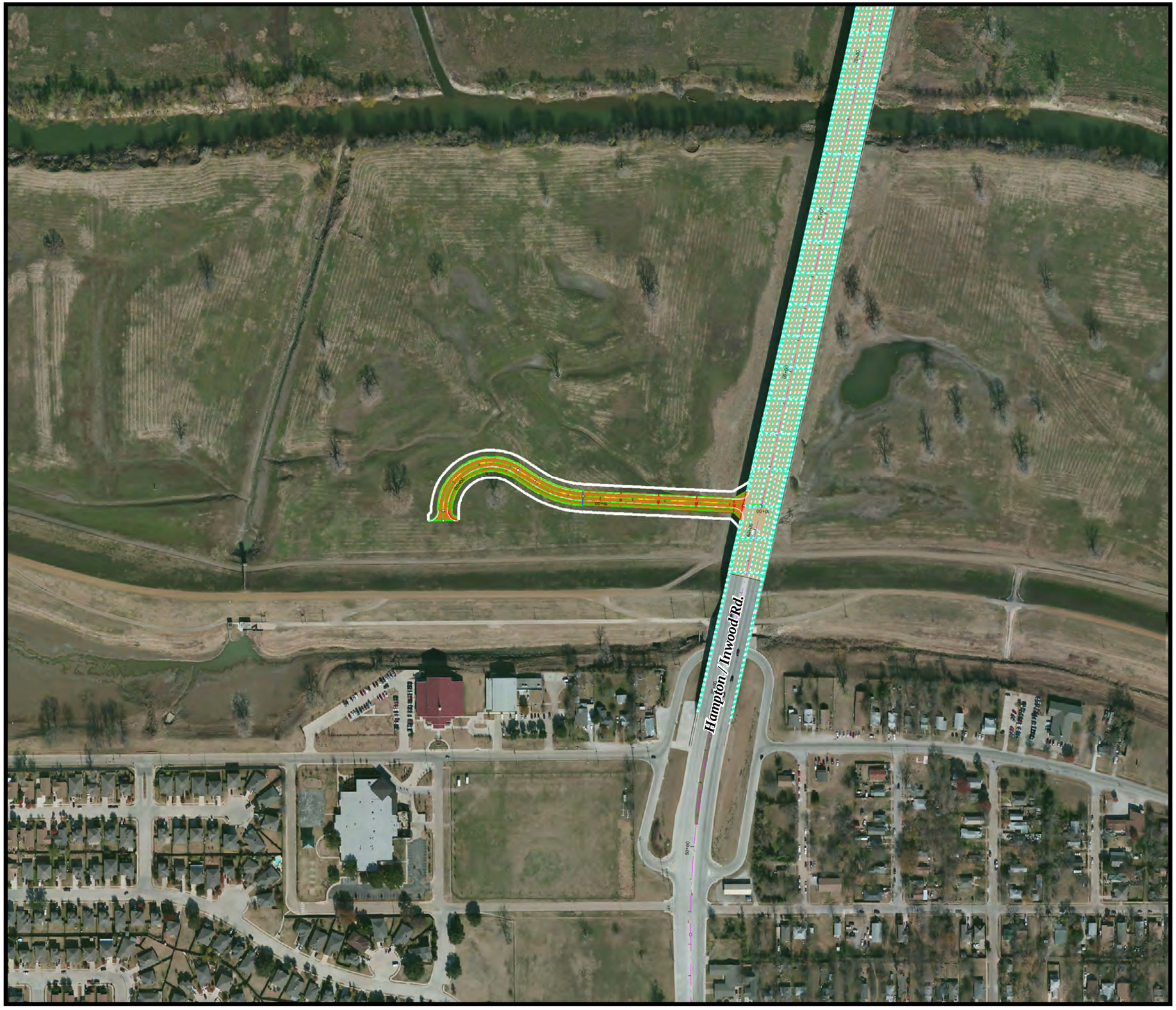


PLATE 2 - 9: Sheet 6 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
- Proposed Diaphragm Wall
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- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

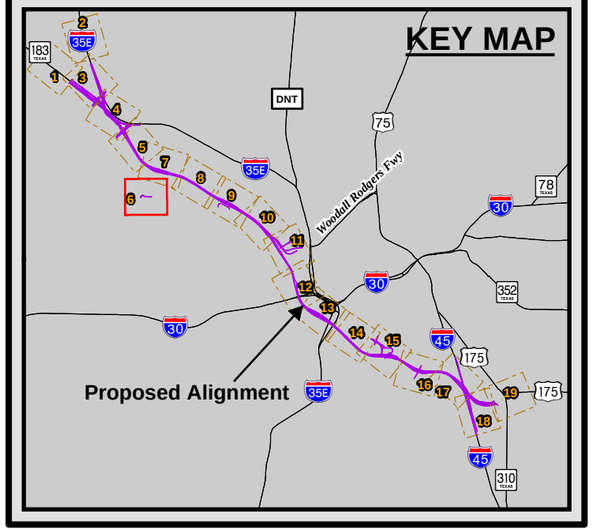

PLATE 2 - 9: Sheet 7 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
- Proposed Diaphragm Wall
- Proposed Flood Wall
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- Proposed Security Wall
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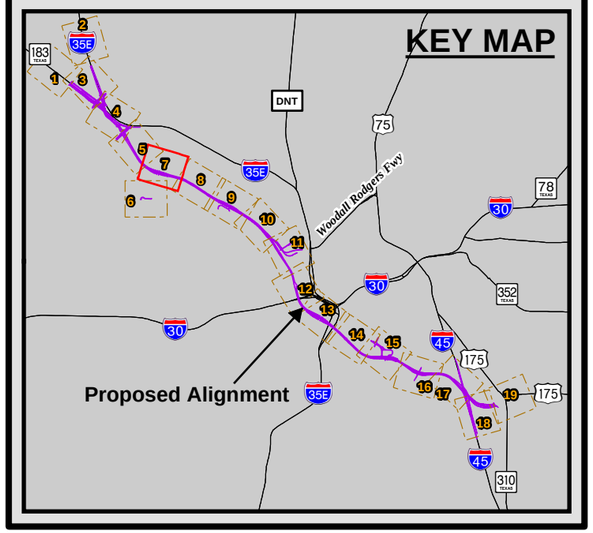
- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.



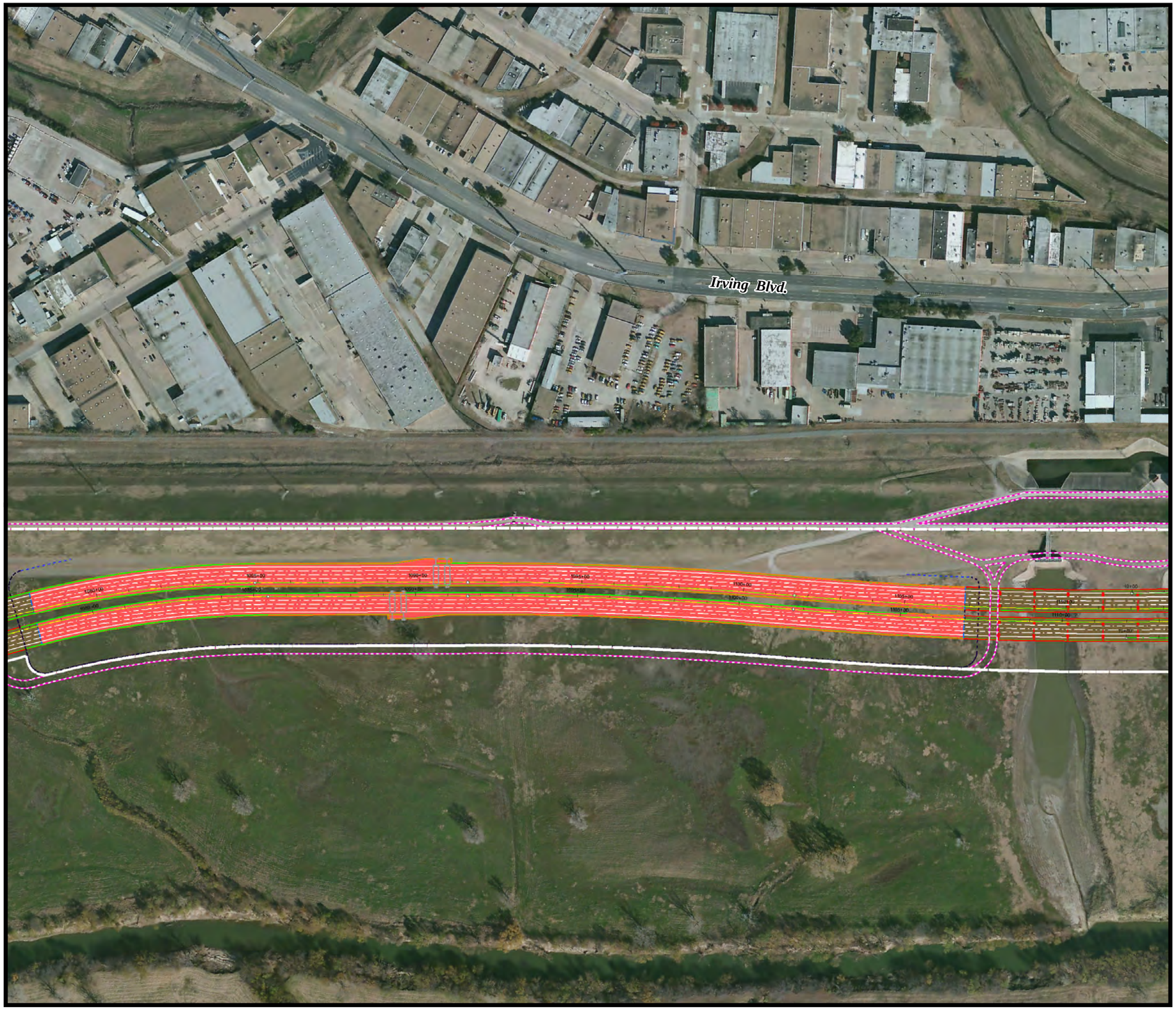


PLATE 2 - 9: Sheet 8 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
- Proposed Diaphragm Wall
- Proposed Flood Wall
- Proposed Retaining Wall
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- Proposed Ramp at Grade
- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

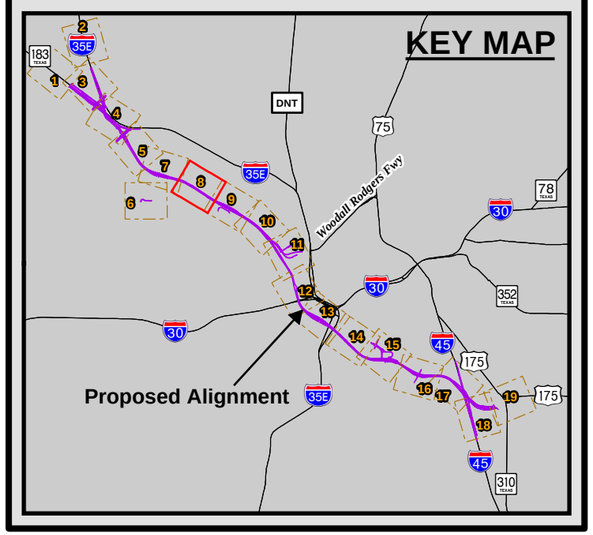

PLATE 2 - 9: Sheet 9 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
- Proposed Diaphragm Wall
- Proposed Flood Wall
- Proposed Retaining Wall
- Proposed Security Wall
- Proposed Culvert
- Proposed Rail
- Proposed Center Barrier
- Proposed Edge of Concrete Pavement
- Proposed Type 2 Curb
- Proposed Sidewalk Edge
- Project by Others
- Proposed Toll Gantry
- Proposed Pavement (by Others)
- Existing Bridge
- Proposed Cross Street at Grade
- Proposed Cross Street Bridge
- Proposed Bridge/Pavement Removal
- Proposed Frontage Road at Grade
- Proposed Mainlane at Grade
- Proposed Mainlane Bridge
- Proposed Park Access
- Proposed Pedstrian Over Bridge
- Proposed Ramp at Grade
- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

N

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SCALE IN FEET

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SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

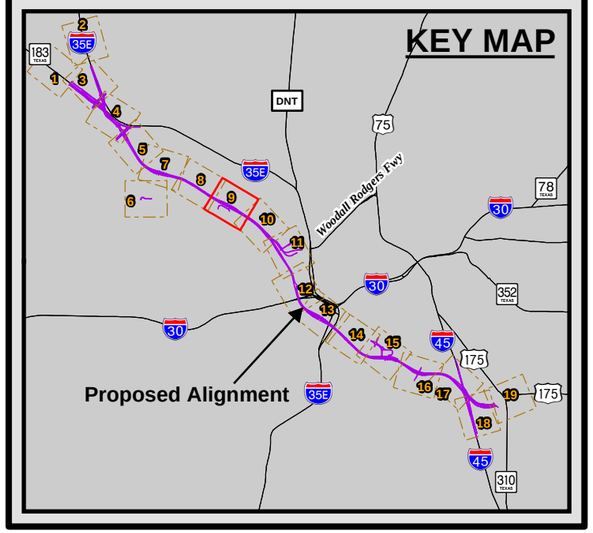

PLATE 2 - 9: Sheet 10 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
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- Proposed ROW

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SCALE IN FEET

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SCALE IN METERS

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Year of Aerial Photograph: 2011.

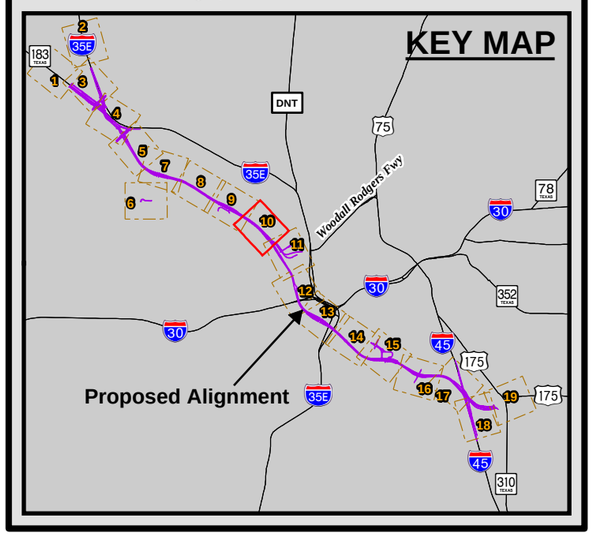
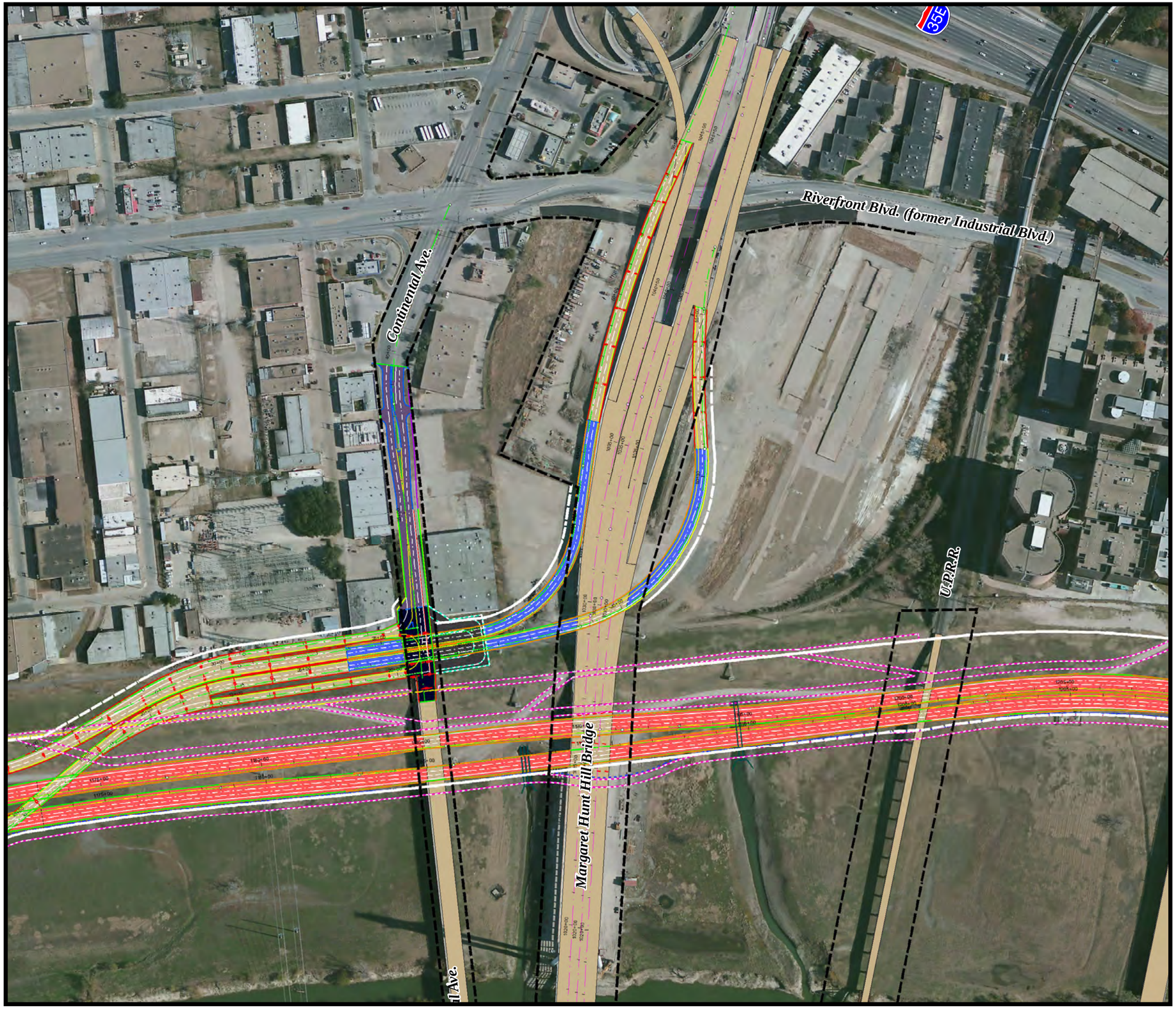


PLATE 2 - 9: Sheet 11 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
- Proposed Diaphragm Wall
- Proposed Flood Wall
- Proposed Retaining Wall
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- Proposed Ramp at Grade
- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

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SCALE IN FEET

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SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

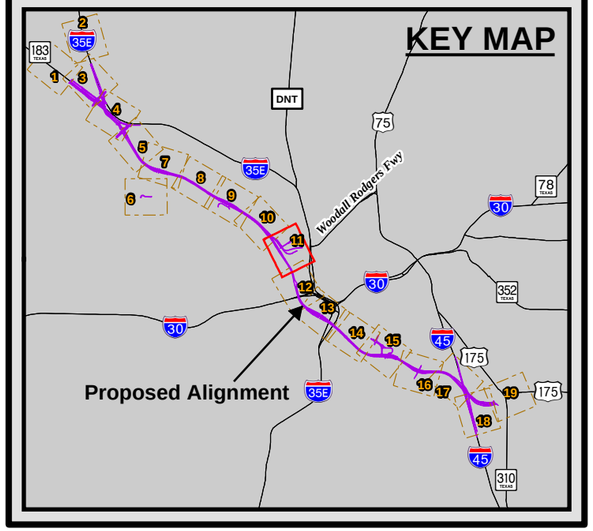
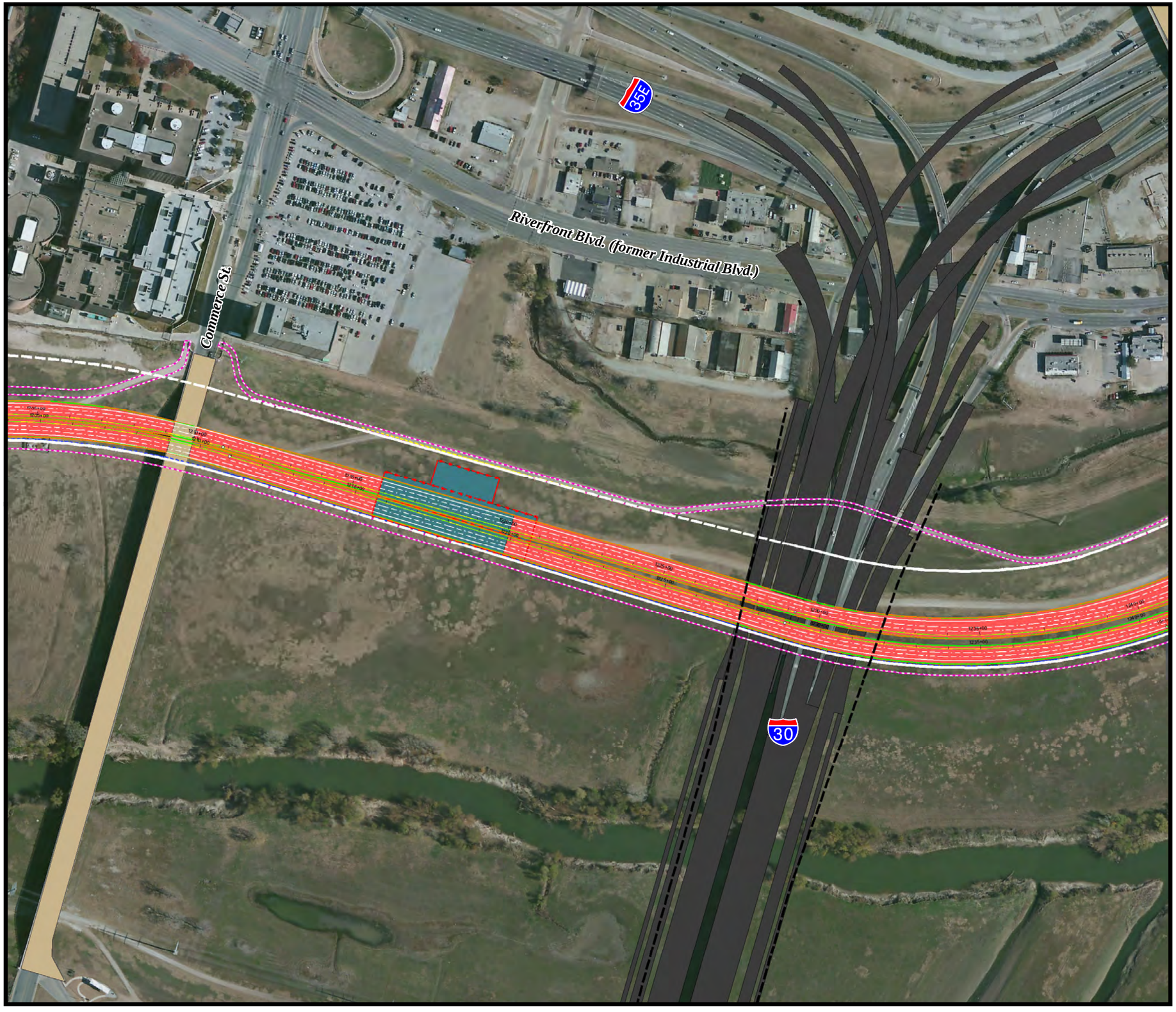


PLATE 2 - 9: Sheet 12 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
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- Proposed Column
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- Proposed Mainlane Bridge
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- Proposed Ramp at Grade
- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

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SCALE IN FEET

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SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

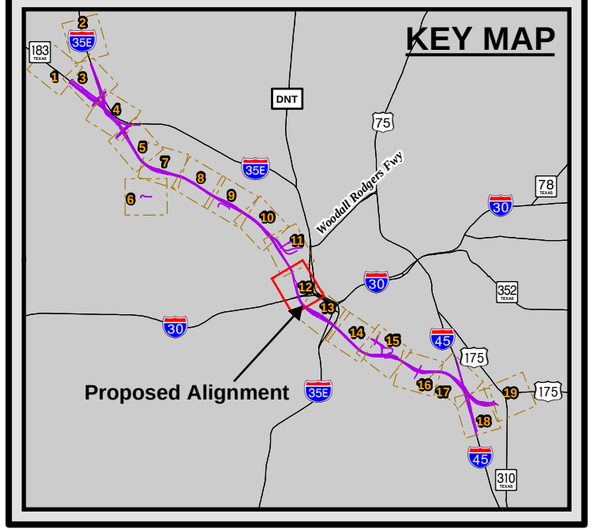
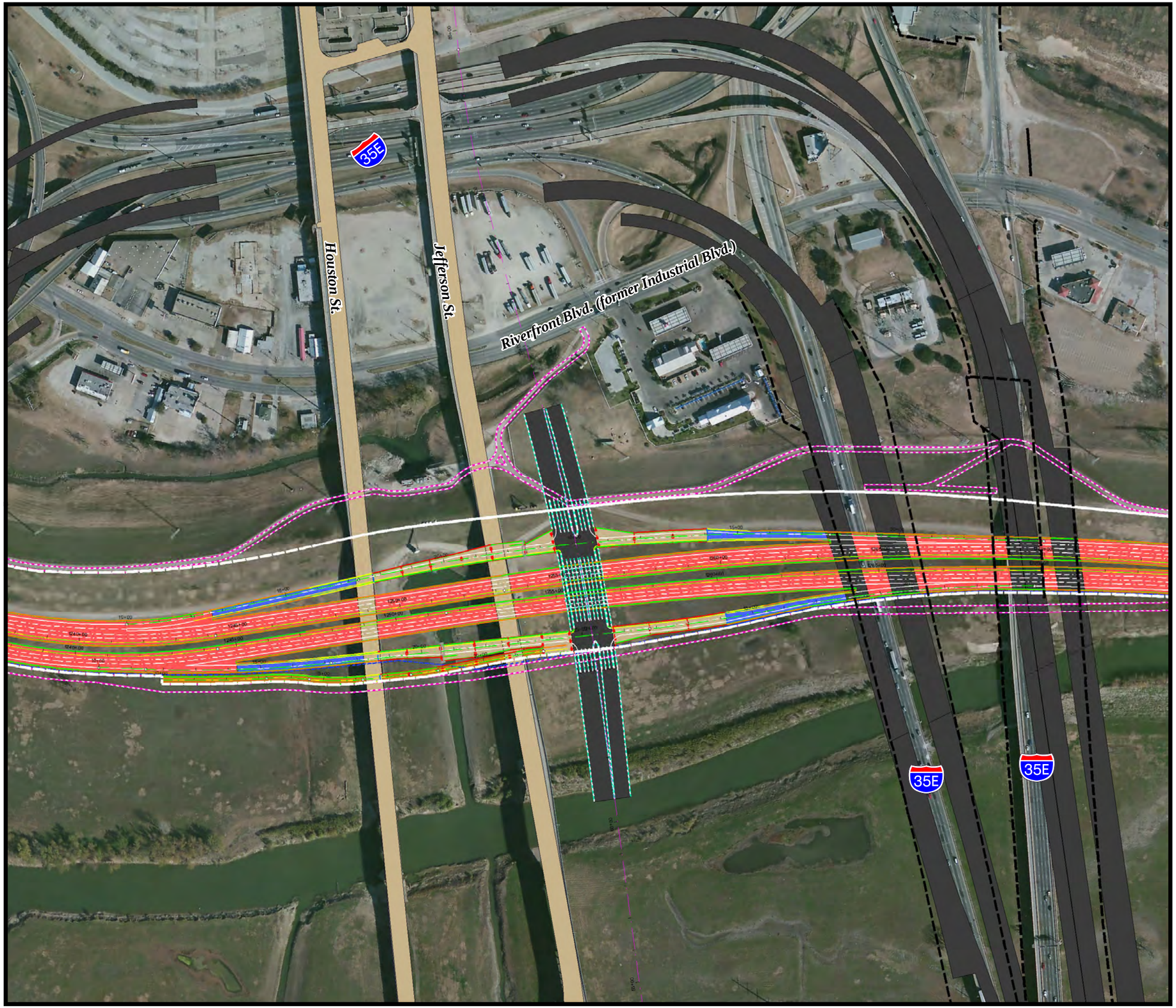


PLATE 2 - 9: Sheet 13 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
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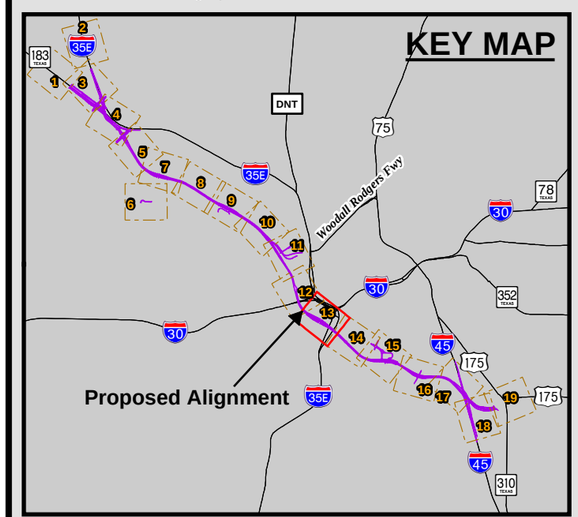
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.



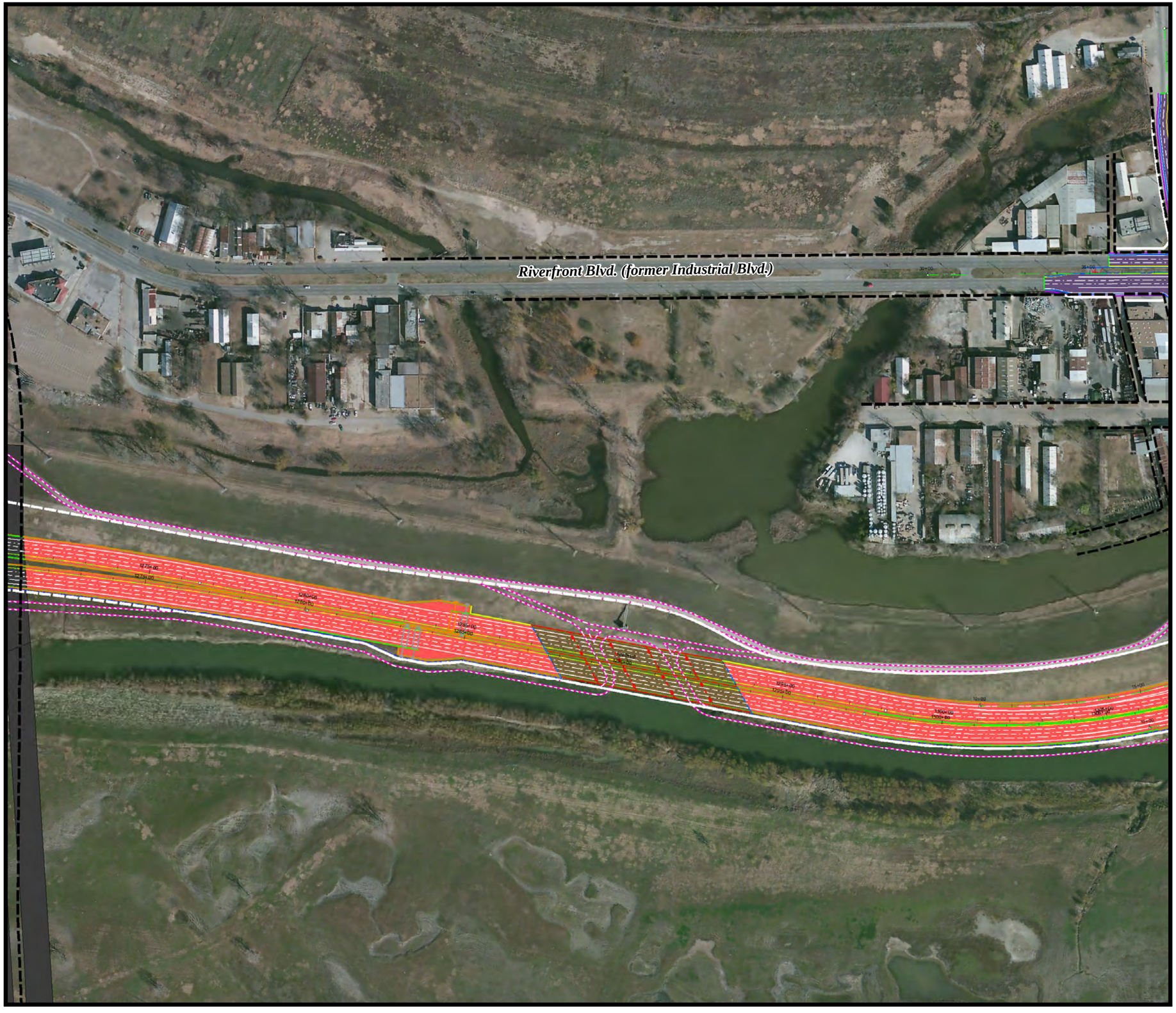


PLATE 2 - 9: Sheet 14 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
- Proposed Diaphragm Wall
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- Proposed Ramp at Grade
- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

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SCALE IN FEET

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SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

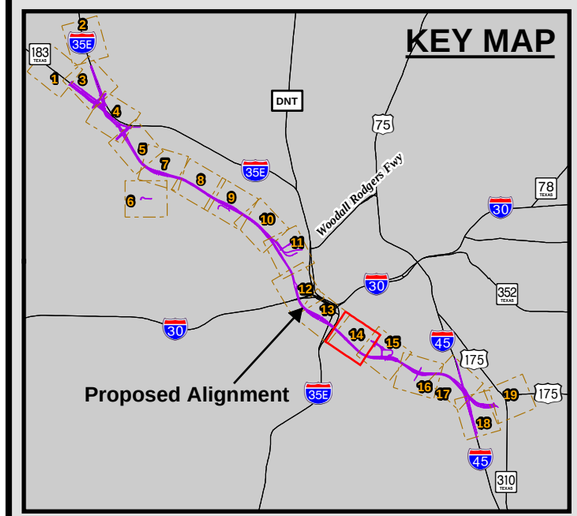
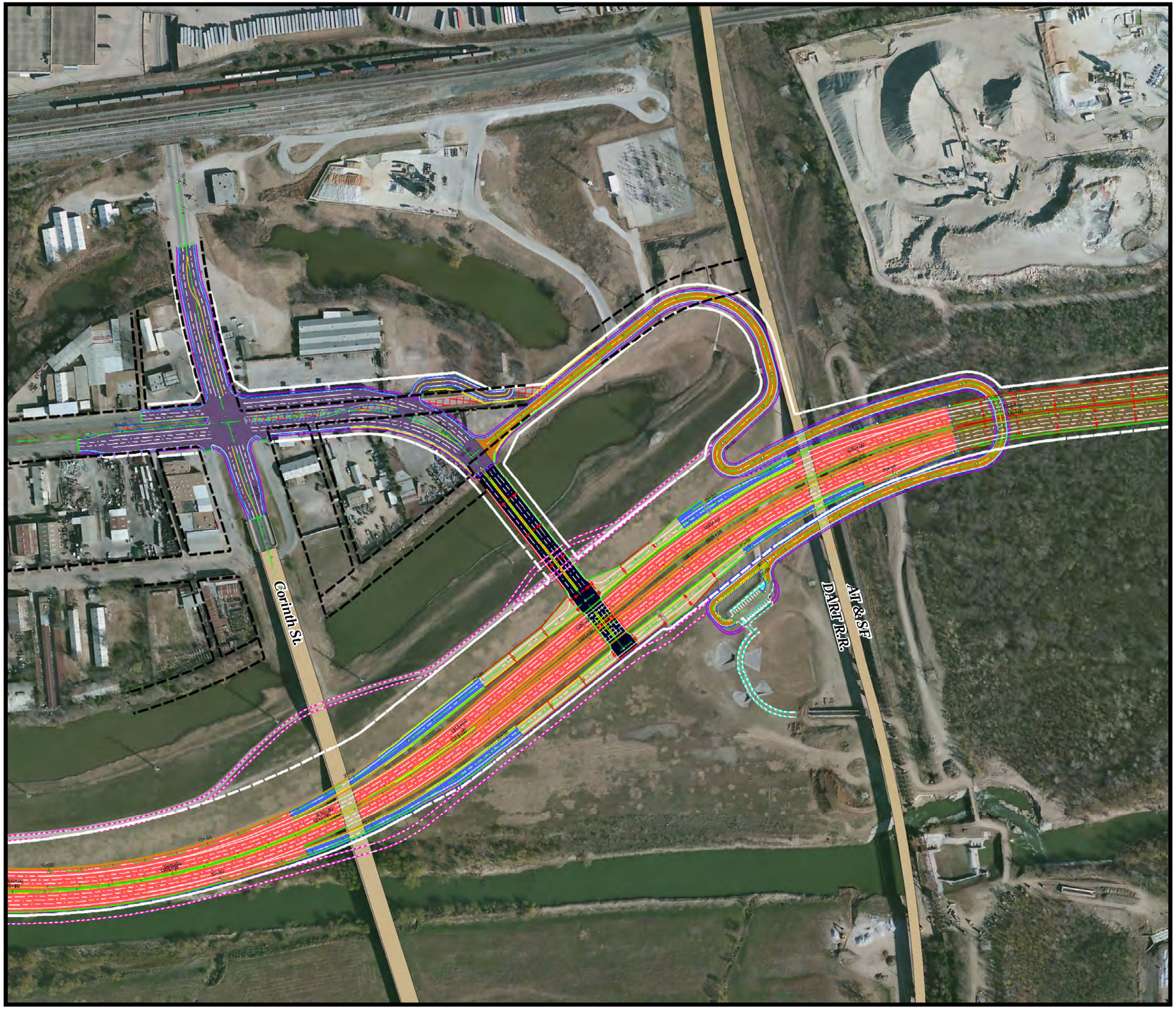


PLATE 2 - 9: Sheet 15 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
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- Proposed Ramp Bridge
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- Proposed ROW

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SCALE IN FEET

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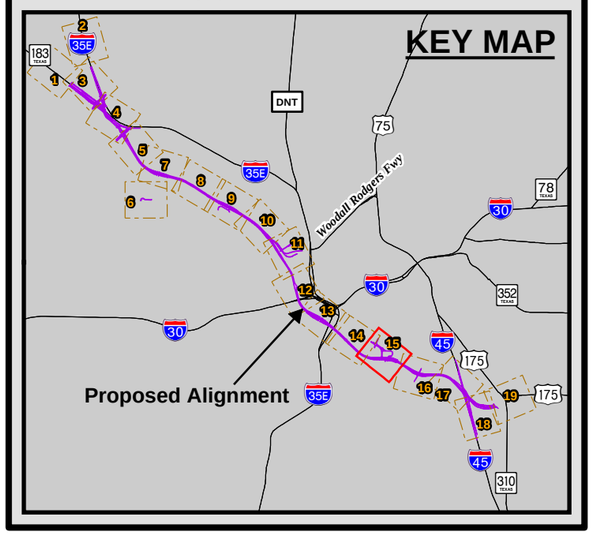
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.



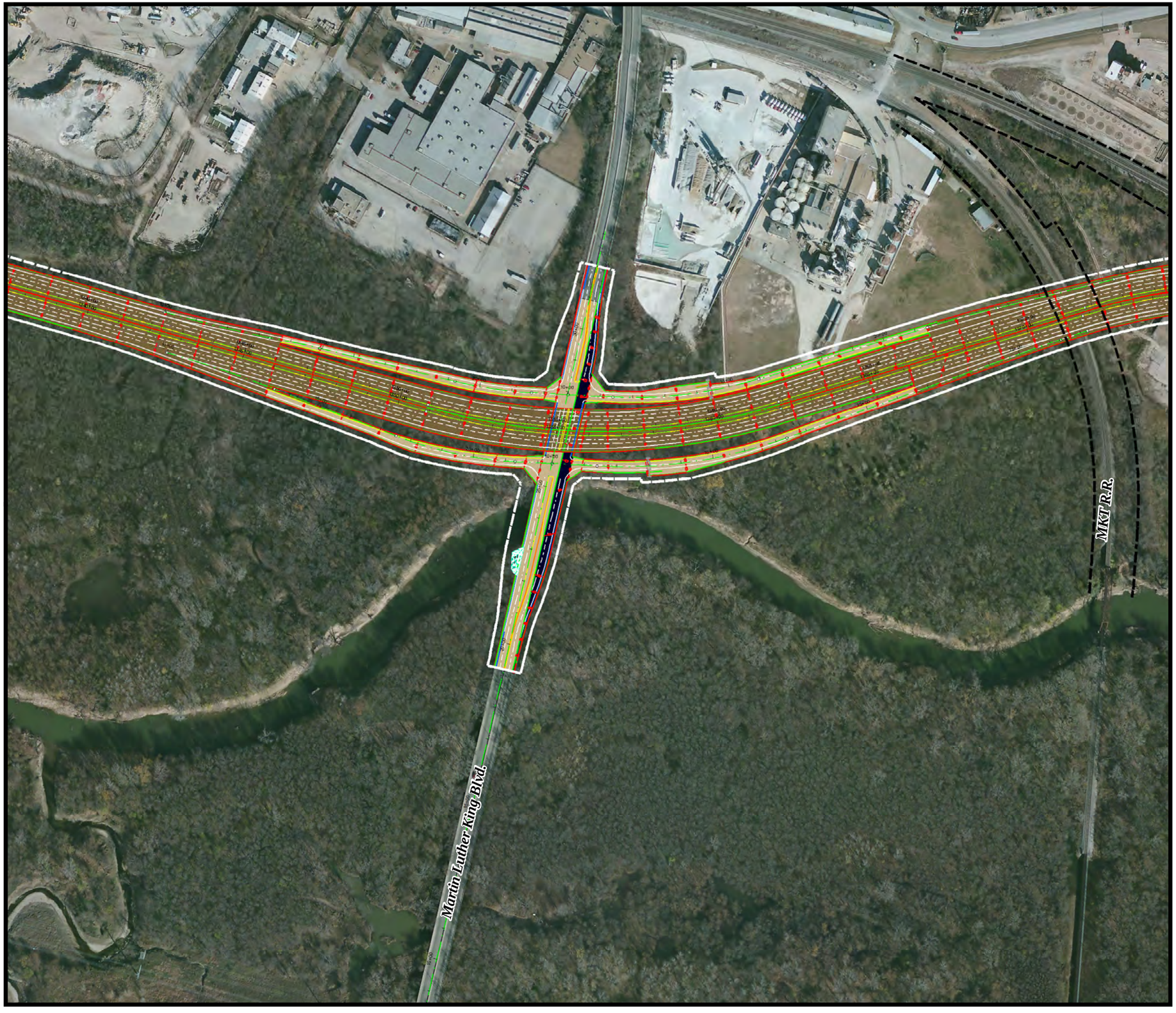


PLATE 2 - 9: Sheet 16 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
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- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

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SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

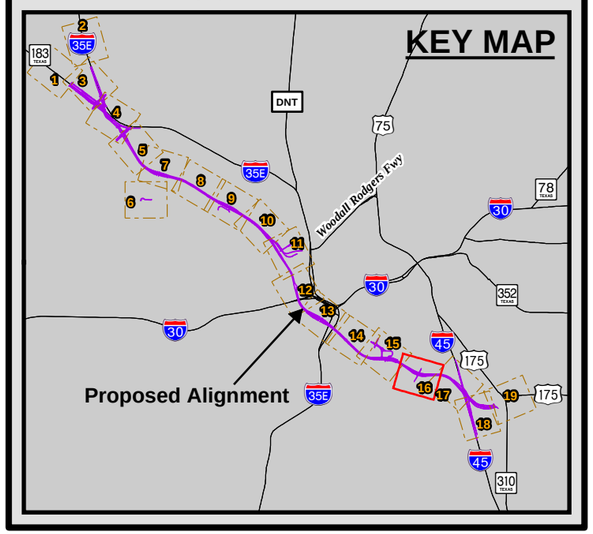
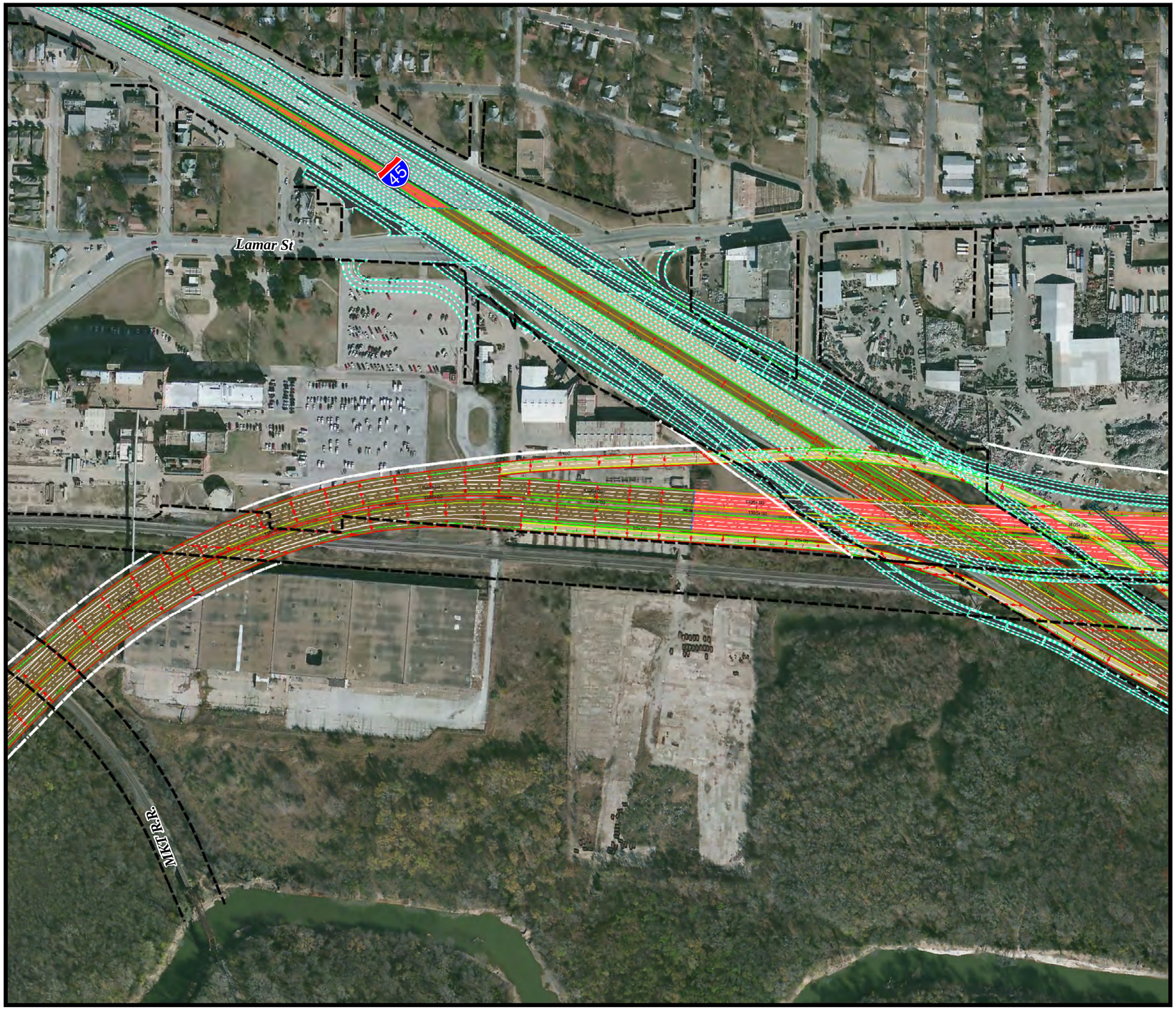


PLATE 2 - 9: Sheet 17 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
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- Proposed Column
- Proposed Diaphragm Wall
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- Proposed Ramp Bridge
- Existing ROW
- Proposed ROW

N

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SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

KEY MAP

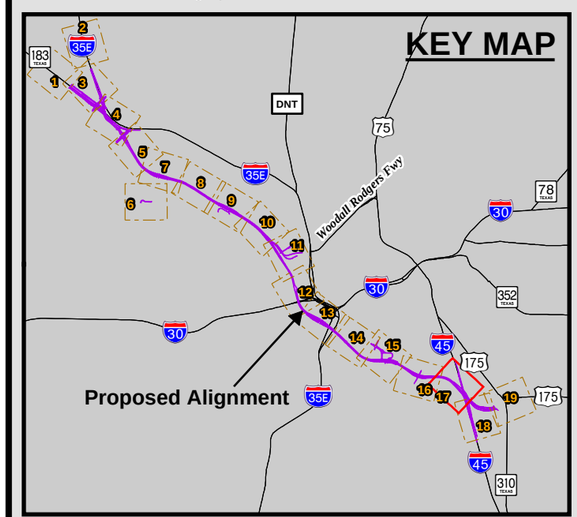

PLATE 2 - 9: Sheet 18 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Column
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- Proposed Ramp Bridge
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- Proposed ROW

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SCALE IN FEET

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SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

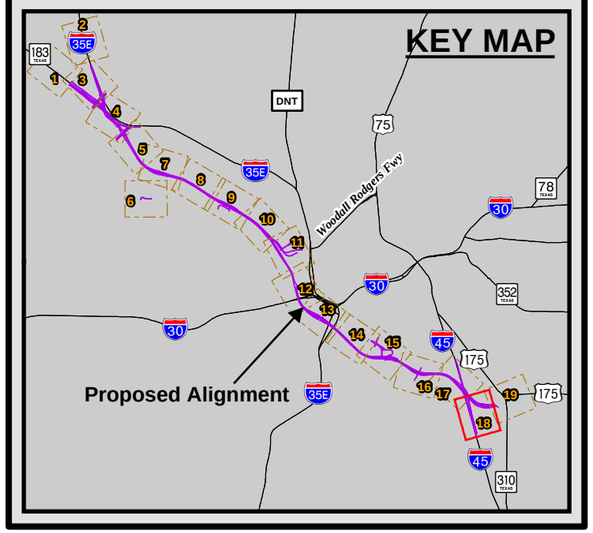
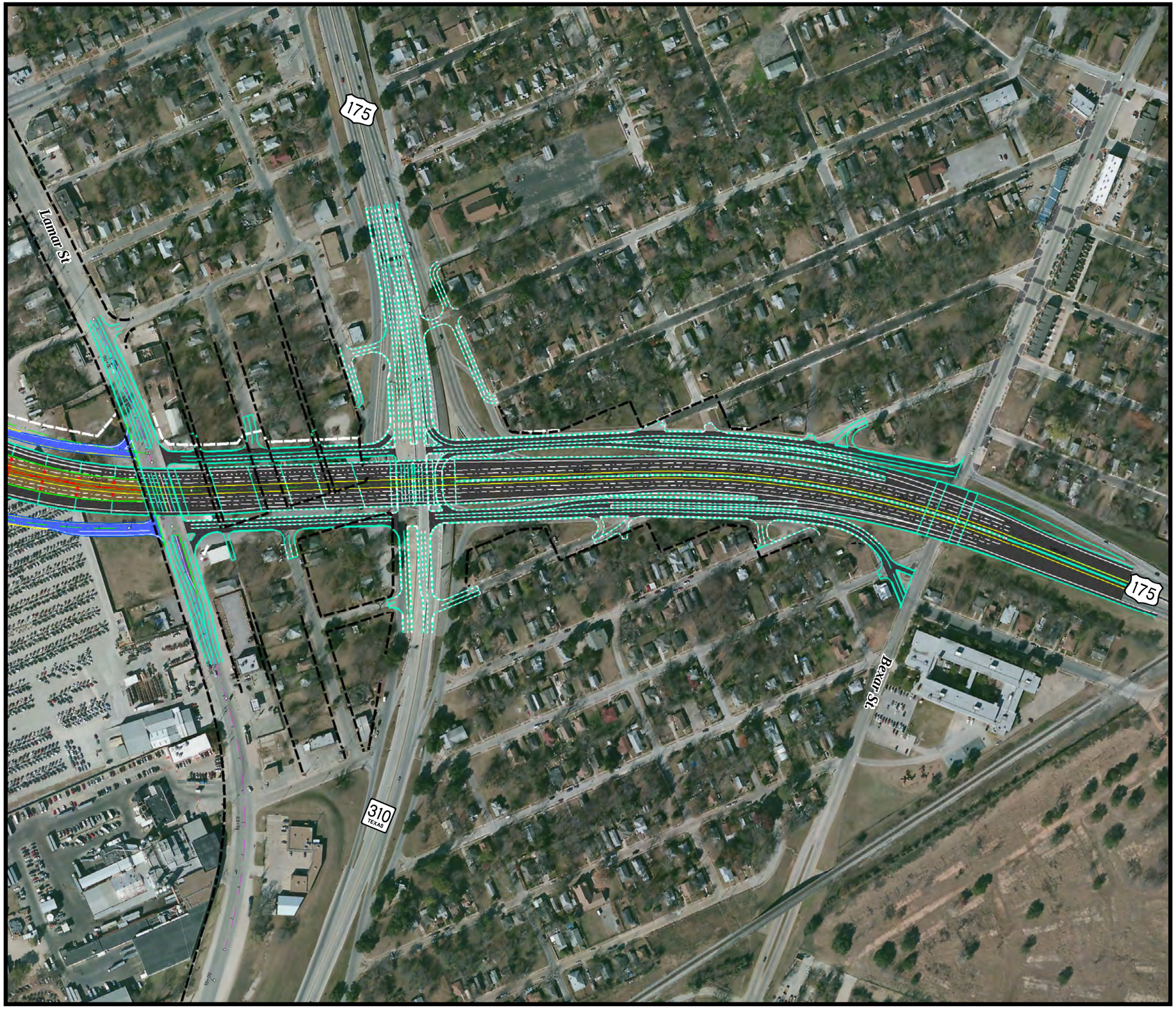


PLATE 2 - 9: Sheet 19 of 19

ALTERNATIVE 3C
PLAN VIEW

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

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N

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SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference section: 2.9.1.3
Year of Aerial Photograph: 2011.

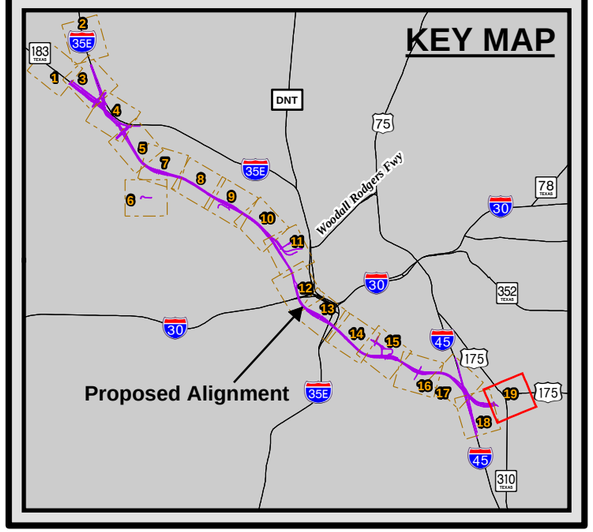
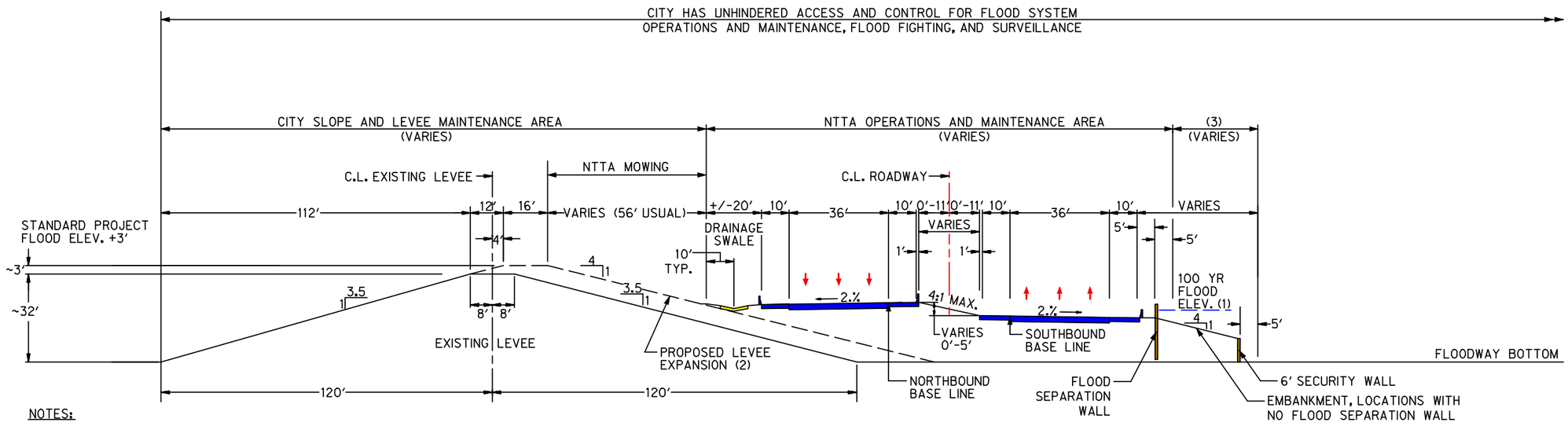


PLATE 2–10
TYPICAL SECTION IN FLOODWAY FOR ALTERNATIVE 3C



NOTES:

1. FLOOD ELEVATIONS, LEVEE HEIGHTS AND SLOPES VARY. THOSE USED IN THIS SECTION ARE TYPICAL.
2. MODIFICATIONS AND IMPROVEMENTS TO EXISTING LEVEES TO BE PERFORMED BY OTHERS.
3. ADDITIONAL NTTA MAINTENANCE AREA FOR LOCATIONS OF SECURITY WALL. NTTA WOULD BE RESPONSIBLE FOR RESTORATION OF SLOPE FAILURES OR OTHER PROBLEMS THREATENING THE ROAD STRUCTURE.
4. A FUTURE INTERLOCAL AGREEMENT BETWEEN THE CITY AND NTTA WILL FURTHER DETAIL AND DEFINE THE MAINTENANCE RESPONSIBILITIES, TIMING AND OVERSIGHT.

TRINITY PKWY ALTERNATIVE 3C
COMBINED PKWY – RIVERSIDE (MODIFIED)
TYPICAL SECTION ALONG FLOODWAY

NOTE: THIS DIAGRAM ILLUSTRATES THE ROW AND LIMITS OF AREAS FOR ANTICIPATED OPERATION AND MAINTENANCE OF THE TRINITY PARKWAY, LEVEES, AND FLOODPLAIN. DESIGN DETAILS ARE SUBJECT TO CHANGE.

TRINITY PARKWAY TYPICAL SECTION OF OPERATIONS AND MAINTENANCE AREA

TRINITY PARKWAY EIS

NORTH TEXAS TOLLWAY AUTHORITY

DALLAS, TEXAS

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
HALFF		OCT. 2013		17826	836-NTTA SECT-131014	